HC

VOLUME 7

RESOURCE ACQUISITION STRATEGY SELECTION

THE EMPIRE DISTRICT ELECTRIC COMPANY

4 CSR 240-22.070

CASE NO. EO-2013-0547

JULY 2013

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TABLE OF CONTENTS

TABLE OF FIGURES

TABLE OF TABLES

TABLE OF APPENDICES

None.

TABLE OF RULES COMPLIANCE

4 CSR 240-22.070 RESOURCE ACQUISITION STRATEGY SELECTION

RESOURCE ACQUISITION STRATEGY SELECTION

4 CSR 240-22.070 Resource Acquisition Strategy Selection

PURPOSE: This rule requires the utility to select a preferred resource plan, develop an implementation plan, and officially adopt a resource acquisition strategy. The rule also requires the utility to prepare contingency plans and evaluate the demand-side resources that are included in the resource acquisition strategy.

SECTION 1 PREFERRED RESOURCE PLAN

(1) The utility shall select a preferred resource plan from among the alternative resource plans that have been analyzed pursuant to the requirements of 4 CSR 240-22.060. The utility shall describe and document the process used to select the preferred resource plan, including the relative weights given to the various performance measures and the rationale used by utility decision-makers to judge the appropriate tradeoffs between competing planning objectives and between expected performance and risk. The utility shall provide the names, titles, and roles of the utility decision-makers in the preferred resource plan selection process. The preferred resource plan shall satisfy at least the following conditions:

(A) In the judgment of utility decision-makers, strike an appropriate balance between the various planning objectives specified in 4 CSR 240-22.010(2);

(B) Invest in advanced transmission and distribution technologies unless, in the judgment of the utility decision-makers, investing in those technologies to upgrade transmission and/or distribution networks is not in the public interest;

(C) Utilize demand-side resources to the maximum amount that comply with legal mandates and, in the judgment of the utility decision-makers, are consistent with the public interest and achieve state energy policies; and

(D) In the judgment of the utility decision-makers, the preferred plan, in conjunction with the deployment of emergency demand response measures and access to short-term and emergency power supplies, has sufficient resources to serve load forecasted under extreme weather conditions pursuant to 4CSR 240-22.030(8)(B) for the implementation period. If the utility cannot affirm the sufficiency of resources, it shall consider an alternative resource plan or modifications to its preferred resource plan that can meet extreme weather conditions.

1.1 Preferred Plan Selection Criteria

All of the IRP analyses and the objectives of the IRP Rule were considered by Empire's decision makers during the preferred plan selection process. The preferred plan represents a balance between the planning objectives, planning risks, resource diversity, rate impacts, and financial measures that were examined using the information generated by the deterministic, stochastic, and risk analyses of this IRP. As reviewed by the Empire IRP team, the following summarizes the preferred plan selection guidance as supplied by the IRP Rule.

- Provide the public with energy services that are safe, reliable, and efficient, at just and reasonable rates, in compliance with all legal mandates, and in a manner that serves the public interest and is consistent with state energy and environmental policies
- Analyze demand-side, renewable energy, and supply-side resources on an equivalent basis (subject to legal mandates)
- Minimize the present worth of long-run utility costs as the *primary criterion* in selecting a preferred plan
- Identify, analyze, and document other considerations to the preferred plan selection such as risks associated with the critical uncertain factors, risks associated with new or more stringent legal mandates, and rate increases
- Strike an appropriate balance between the various planning objectives
- Invest in advanced T&D technologies unless not in the public interest
- Utilize demand-side resources to the maximum amount that comply with legal mandates, and are consistent with the public interest and achieve state energy policies

1.2 Preferred Plan Selection Process

Ventyx, an ABB Company (Ventyx) was retained by Empire to provide analytical services in support of the 2013 IRP. Ventyx and Empire undertook a detailed analysis of the performance of the resource plans. Multiple alternative resource plans with demand-side and supply-side "build outs" were developed with the Capacity Expansion Model (CEM). All plans were then subjected to full financial modeling including the calculation of net present value of revenue

requirements (PVRR) in the Strategic Planning model powered by MIDAS Gold (MIDAS). Additionally, all plans were evaluated in the decision analysis phase, represented by a decision tree in the MIDAS model. From this modeling, a detailed risk analysis was performed for each of the 18 plans.

This process can be considered as a three-phase approach. Both candidate demand-side and supply-side resources were considered as available resources in the IRP's integration process. During Phase 1 (capacity expansion modeling), specific optimized resource plans were developed based on the lowest present value of revenue requirements (PVRR) for each of different scenarios with a capacity expansion model. Each set of resources were developed specifically to perform the best under the assumptions made about the possible future for each plan. These plans may not be directly comparable since the assumptions about the future may vary significantly between the plans.

In Phase 2 (deterministic analysis), each plan that was developed during Phase 1 was evaluated against the base case assumptions. Hourly dispatch of the units and full financial modeling was performed over the planning horizon. Deterministic PVRRs were calculated to compare plans against each other. In Phase 3 (stochastic/risk analysis), each plan was subjected to decision analysis (with the critical uncertain factors), again, with full financial modeling over the planning horizon. These stochastic runs generated 54 endpoints for each of the plans analyzed. The results from this phase were used to develop risk profiles and tornado charts across all plans. Ventyx performed risk analyses to evaluate Empire's portfolio under varying conditions, identifying a wide range of possible outcomes. All of these analyses and the objectives of the IRP Rule were considered by Empire's decision makers during the development of the preferred plan. The preferred plan represents a balance between the planning objectives, planning risks, and financial impacts examined using the deterministic, stochastic, and risk analyses.

The demand-side inputs were supplied to Ventyx from Applied Energy Group (AEG). Ventyx developed load shapes for distributing energy savings for the integration modeling. The demand-side programs are essentially a modification to the load forecast inputs. The CEM model did not optimize demand-side resources. CEM optimized supply-side resources around the demand-side resource modified load. In addition to demand-side energy and coincident peak savings, AEG also provided all program costs and the information required to calculate a net shared benefit. The costs associated with the demand-side resources, including the net shared benefit, were input into the MIDAS model and assumed to be recovered in a timely manner through customer rates.

1.3 Present Value of Revenue Requirements

Minimization of PVRR is a primary criterion for the selection of the preferred plan. *Figure 7-1* displays the PVRR of all 18 plans *utilizing the base assumptions* prior to introducing uncertainty represented by the decision tree (the deterministic case).

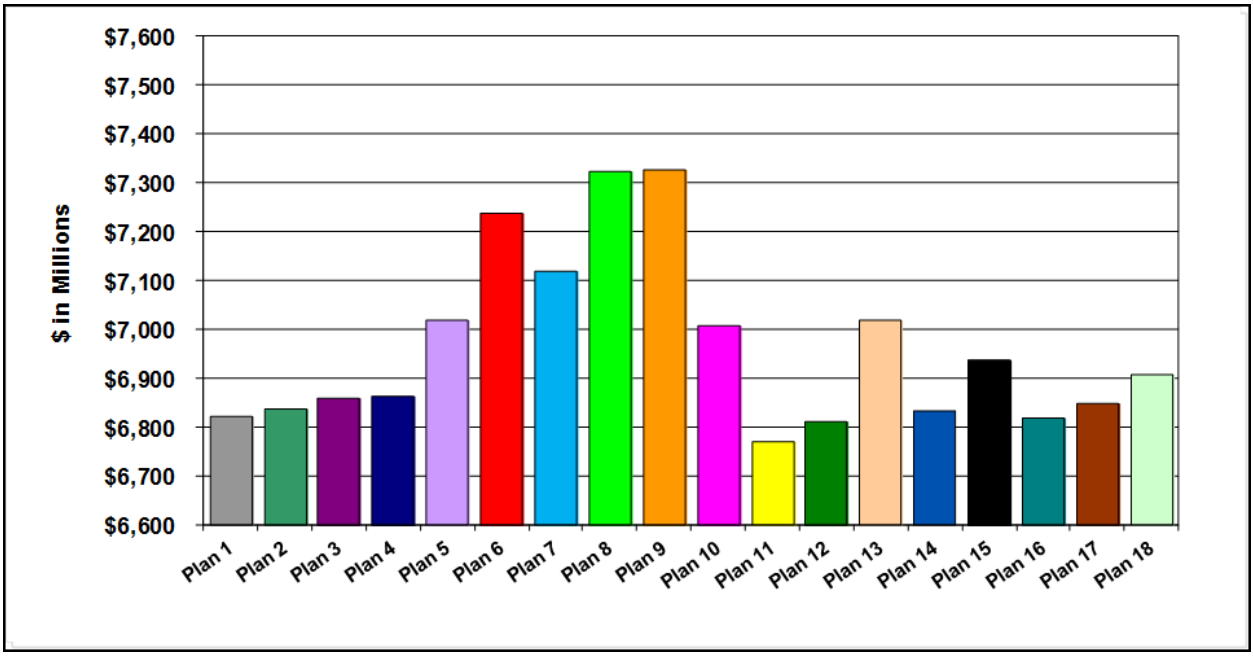

Figure 7-1 - Deterministic PVRR for All Plans (2013-2031)

The results of decision analysis (using the critical uncertain factors) provides the uncertainty range in addition to the PVRR for each of the alternative resource plans, as shown in *Figure 7-2.*

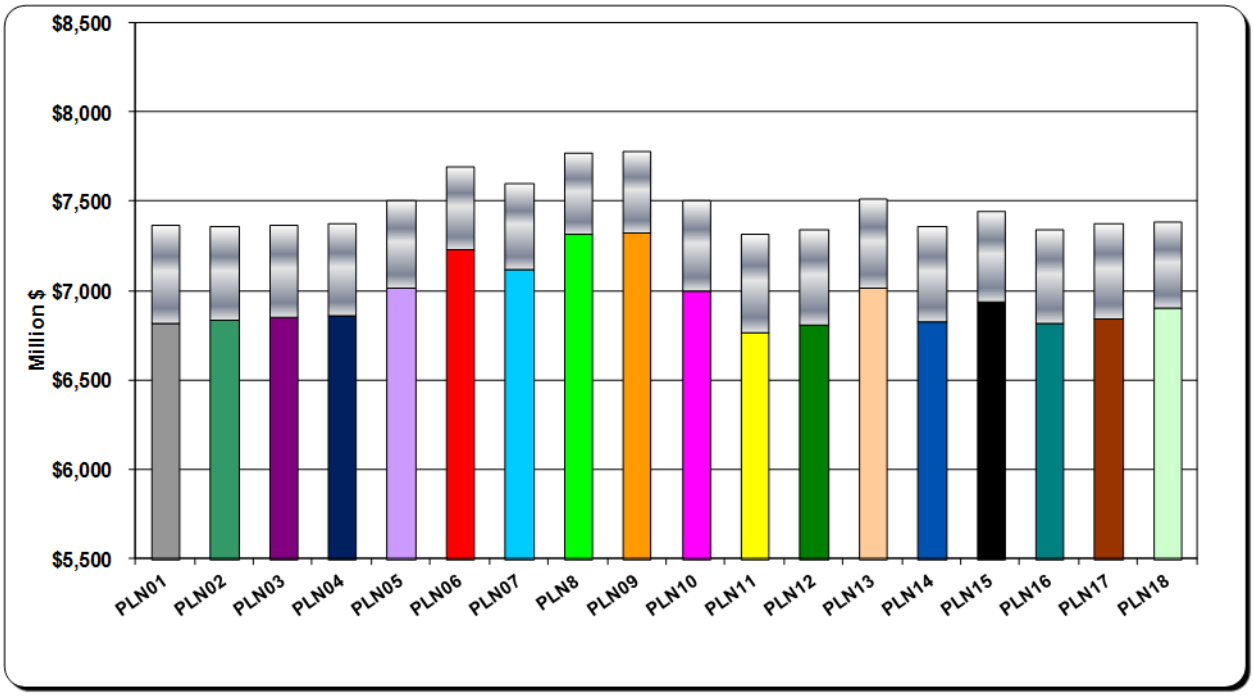

Figure 7-2 - PVRR with Risk Value for All Plans (2013-2031)

1.5 Preferred Plan Selection

Since finding a low cost plan is a primary-*but not the only*-objective, Empire focused on a set of low cost plans that were variations of the base case plan and included a wide range of demand-side portfolios (RAP, RAP minus, RAP + and RAP ++ and no DSM) as shown in the *Figure 7-3* for the base plans listed in *Table 7-1.*

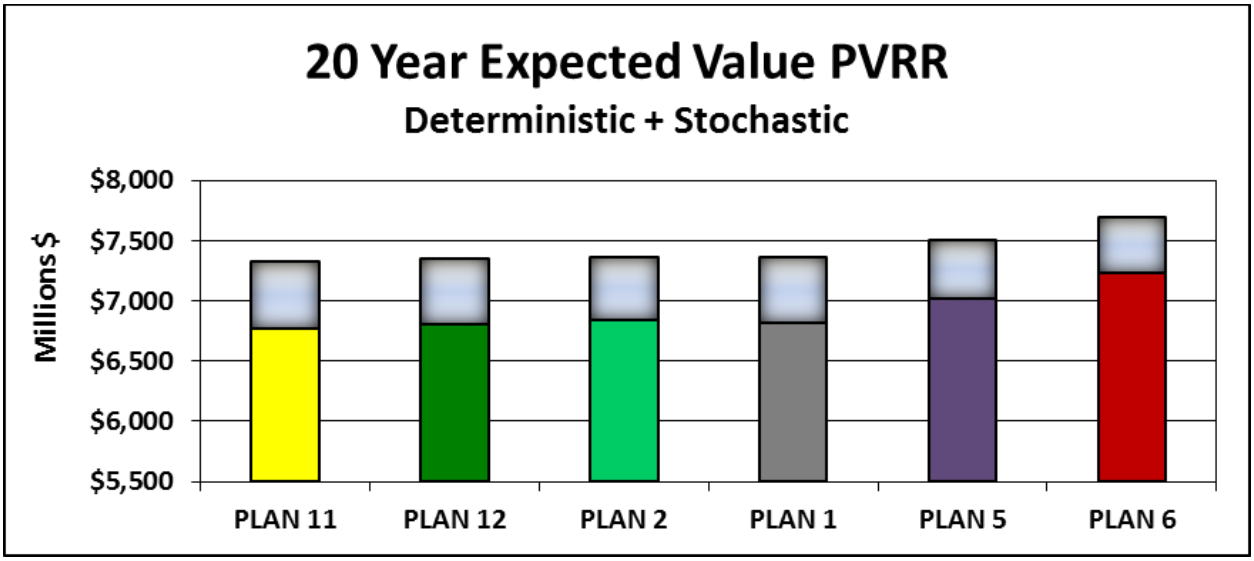

Figure 7-3 - Expected 20-Year PVRR of Base Plans

Plan	Base Plan Description
1	Base Case
2	Base Case (meet RPS)
5	RAP + DSM
6	RAP ++ DSM
11	No DSM
12	RAP minus DSM

Table 7-1 - Base Plans List

Even though Plan 1 (Base case) was included among the group of low cost plans, it was eliminated from consideration since it did not meet Missouri renewable energy standard (RES) requirements following the expiration of Empire's current wind PPA contracts near the end of the planning horizon. The plans with the highest levels of DSM-Plan 5 (RAP + DSM) and Plan 6 (RAP ++ DSM) were eliminated because they were the two highest cost plans from this group of plans. These plans were created to test for the "correct" RAP DSM level, but they did not appear to "fit" as well with Empire's system with the current IRP assumptions that include low avoided energy costs due to low natural gas and market power prices; low avoided capacity costs; low load growth; and no uncommitted supply-side resource needs until the latter part of the study period.

Plan 11 (No DSM), Plan 12 (RAP minus DSM), and Plan 2 (RAP DSM) are all very close with regard to PVRR. More specifically, Empire looked at the difference in the 20-year PVRR among these plans and found that they were within 1 percent of each other. On a 40-year PVRR basis, the plans are all within a 0.5 percent of each other. With all of the assumptions and future unknowns in an IRP process, the PVRR of these three plans can be judged to be nearly identical for preferred plan selection purposes. Additionally, these plans have similar rate impacts and similar risk profiles. The risk profile graphic for the plans considered is shown *Figure 7-4.*

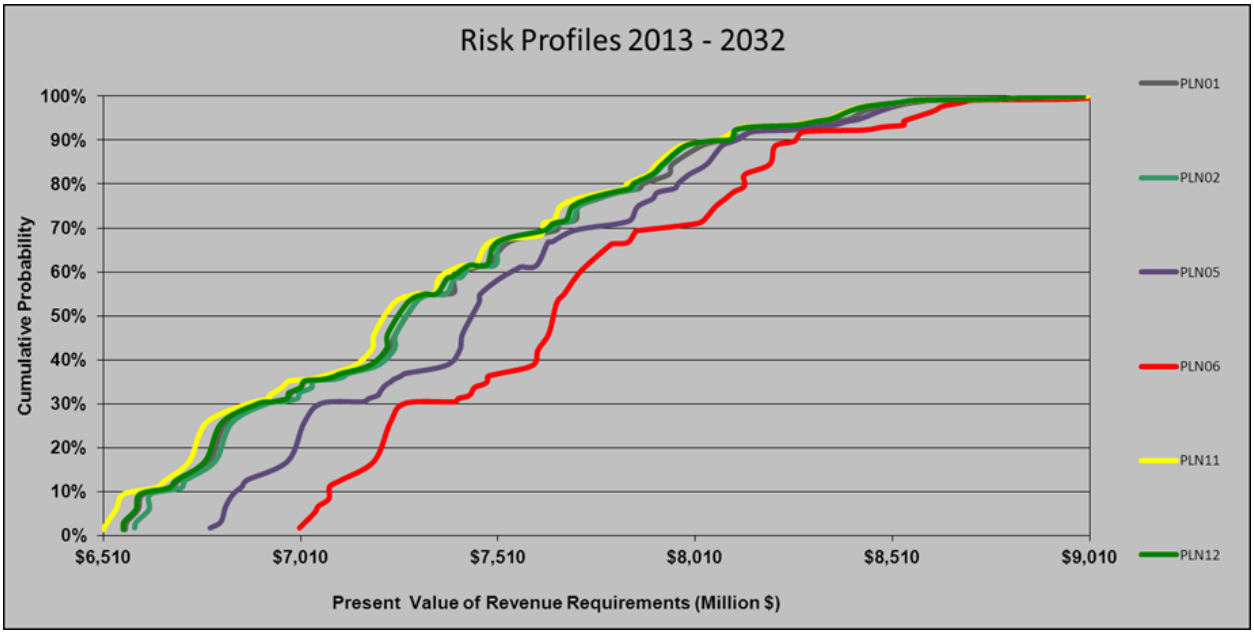

Figure 7-4 - Risk Profiles of Base Plans

Therefore, considering all of the preferred plan selection criteria, and attempting to strike a balance over all of the planning objectives, Empire has selected Plan 2 with the RAP DSM level as the preferred plan. Plan 12 (RAP minus DSM)-which contains the same demand-side programs, but lower customer participation levels to account for demand-side load impact uncertainty-and Plan 11, which contains no DSM, are considered contingency plans depending on the outcome of Empire's upcoming MEEIA filing.

Empire's internal IRP team met on June 7, 2013 to review the results of the 2013 IRP and to select the preferred resource plan. Empire met with its IRP Stakeholder Advisory Group on June 17, 2013 to review Empire's preferred plan and the selection process.

1.6 Preferred Plan Description

In the judgment of Empire's decision makers, Plan 2 was selected as the Preferred Plan. Plan 2 contains the DSM portfolio that AEG screened as the realistic achievable potential (RAP) for Empire. Having some level of DSM with appropriate cost recovery increases resource diversity, is aligned with state energy policy and offers a better hedge against future environmental uncertainty as compared to a plan with no DSM. Additionally, Empire agreed to bring forward as part of a follow on MEEIA filing, any cost effective realistic achievable potential (RAP) DSM portfolio from the 2013 IRP's preferred plan. Empire agreed to make the follow on MEEIA filing within 90 days of a meeting with the Advisory Group to Empire's IRP, unless agreed otherwise by the parties. Therefore, while Empire selected Plan 2 as the preferred plan in its 2013 IRP, the selection and implementation of the DSM included in the preferred plan and the demand-side investment mechanism (DSIM) required to support that level of DSM investment will be the subject of Commission review and approval in the upcoming MEEIA filing.

1.6.1 Supply-Side Resources in the Preferred Plan

The retirement of Asbury 2 in 2014 reduces available capacity by 14 MW. However, the result of the ongoing AQCS and turbine project will restore 5 MW net in 2015 to Asbury 1. The capacity lost from the retirement of Riverton 7, 8, and 9 in 2016 will be replaced by the ongoing conversion of Riverton 12 to combined cycle , resulting in a net capacity increase of about 4 MW in 2016. For planning purposes, the Preferred Plan assumes the 82-MW Energy Center 1 will be retired in 2032 after 53 years of service, as shown in *Table 7-2.*

All other existing Empire generating units are presumed to continue operations throughout the planning horizon. However, the 105-MW Meridian Way 20-year wind PPA will expire in 2029, and the 150-MW Elk River 20-year wind PPA will expire in 2030 with a 5-year extension assumed for Elk River.

The Preferred Plan will satisfy future capacity needs by the installation of natural gas-fired, aeroderivative combustion turbines in 50-MW increments beginning in 2027, adding a second in 2031, and a third in 2032. Distributed generation of 5 MW was added in the Preferred Plan in 2031. Future RES requirements will be satisfied with additional wind PPAs totaling 100 MW in 2028 and increasing to 300 MW in 2031. The Plan 2 supply side additions are further illustrated in *Figure 7-5*.

Empire 2013 IRP Preferred Resource Plan Highlights		
Year	**Common to All IRP Plans (Applies to Preferred Plan)**	**Plan 2 (Preferred Plan Additions)**
2012	Transition Riverton 7-8 from coal operation to natural gas only operation (completed in September 2012)	
July-2013	file 2013 IRP	
Late 2013	MEEIA filing	
2014	Retire Asbury 2 coal unit (-14 MW with retirement)	RAP DSM portfolio implementation
2015	Complete Asbury unit 1 coal unit AQCS & turbine project (+ 5 MW expected)	
2016	Retire Riverton natural gas units 7, 8 & 9 (- 104 MW total with retirement); Complete the conversion of 142 MW Riverton 12 CT to a 250 MW combined cycle (estimated +100 MW addition)	
2017		
2018		
2019		
2020		
2021		
2022		
2023		
2024		
2025		
2026		
2027		50 MW Aero CT addition
2028	Meridian Way 105 MW wind PPA expires (estimated -5 MW with contract expiration based on 5% accredited capacity rating)	
2029		100 MW Wind PPA addition (estimated +5 MW based on 5% accredited capacity rating)
2030	Elk River 150 MW wind PPA expires after 5-year extension (estimated -8 MW with contract expiration based on 5% accredited capacity rating)	
2031		50 MW Aero CT addition; 5 MW Distributed Generation addition; 200 MW Wind PPA addition (estimated +10 MW based on 5% accredited capacity rating)
2032	Energy Center 1 CT assumed to retire for IRP purposes (-82 MW with retirement)	50 MW Aero CT addition

Table 7-2 - Preferred Plan Highlights

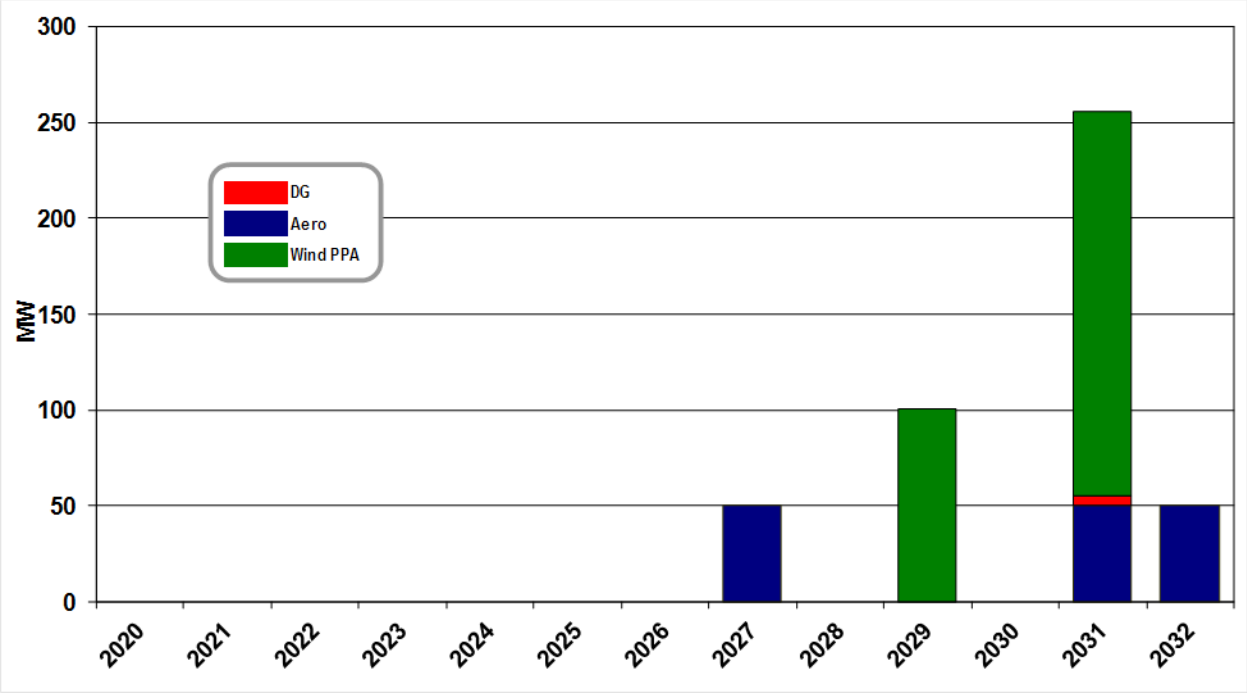

Figure 7-5 - Preferred Plan Supply-Side Additions

1.6.2 Demand-Side Programs in the Preferred Plan

Empire's 2013 IRP assumed that implementation of all programs would occur in year one, but the exact timing will depend on the outcome of the follow on MEEIA filing. At this point, it is assumed that the new Missouri DSM portfolio would be implemented in 2014. The portfolio of programs is summarized below in *Table 7-3*.

Residential Energy Efficiency Programs	
Residential Products Program	Point-of-sale incentives for qualifying CFL and LED bulbs and mail-in rebates for qualifying ENERGY STAR® appliances.
Appliance Recycling	$35 rebate for recycling an old, inefficient refrigerator or freezer.
High Efficiency HVAC	Incentives for the purchase and installation of qualifying HVAC equipment.
Whole House Efficiency	The program has two components: ***Direct Install.*** The customer receives a free audit and installation of measures such as air sealing, CFLs, aerators, advanced power strips, and hot water pipe insulation. ***Insulation.*** Customer incentives available for installing attic insulation.
Low Income Weatherization	Supplements the federal Low Income Weatherization Assistance Program, reducing energy costs for eligible low income homeowners and renters through increased home efficiency. Assumes an average cost per residential home of $1,200.
Low Income New Homes	Customers receive up to $1,500 for qualifying efficiency improvements.
School Energy Education Program	Offers classroom activities and a kit of low-cost energy efficiency and water conservation products to 6th grade students within the Empire service territory.
Commercial & Industrial Energy Efficiency Programs	
Small Business Lighting	Small commercial customers will receive incentives up to 70% of installed lighting equipment costs.
C&I Energy Efficiency Rebate	Customers receive up to $20,000 for prescriptive or custom equipment installed.
Building Operator Certificate	$575 incentive for building equipment and processes training and certification.
Interruptible Service Rider	Incentives for reducing load during peak periods, upon request by Empire.

Table 7-3 - DSM Program Portfolio Summary

The preferred plan's DSM resources are contingent on the outcome of the MEEIA filing that is expected to be made in the last quarter of 2013. As planned, the new Missouri DSM portfolio would consist of the newly authorized DSM programs along with a continuation of some of Empire's existing DSM programs. However, the existing programs have updated incentives, participants and budgets.

Table 7-4 shows Empire's preferred plan demand-side program costs, projected energy savings, and the projected impact on the system peak. The level of demand-side investment included in the Preferred Plan, which is expected to be recovered in rates, is about 4.5 to 5 times Empire's existing DSM investment. The DSM in the preferred plan also incorporates an increased emphasis on marketing and third party implementation experts to maximize participation.

Year	Program Costs	Energy Savings (MWH)	Coincident Peak (MW)
2013	4,922,467	18,614	5.98
2014	5,116,862	38,073	9.49
2015	5,227,787	54,840	12.85
2016	5,314,795	71,900	16.34
2017	5,326,030	88,967	19.84
2018	5,326,030	97,040	22.44
2019	5,330,545	104,981	24.96
2020	5,332,023	115,577	27.65
2021	5,306,088	121,208	29.98
2022	5,322,941	126,604	32.30
2023	5,316,221	131,431	34.46
2024	5,333,073	136,114	36.60
2025	4,918,353	140,683	38.70
2026	5,070,398	150,247	41.07
2027	5,087,251	159,799	43.45
2028	5,097,383	164,324	44.72
2029	5,097,383	167,234	45.71
2030	5,114,236	170,001	46.69
2031	5,131,088	171,823	47.21
2032	5,131,088	173,501	47.64

Table 7-4 - Preferred Plan DSM Impact

Table 7-5 on the following page is the required forecast of capacity balance form for the selected plan and provides more detail about the schedules, supply-side resources, and DSM resources planned for meeting Empire's loads while complying with current legal mandates.

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Table 7-5 - Plan 2 Preferred Plan

1.6.3 Advanced Transmission and Distribution Technologies in the Preferred Plan

Empire is a member of the Southwest Power Pool (SPP) and relies on SPP's determination of transmission line expansion projects and their schedules throughout the SPP nine-state region. Empire is assigned its membership cost allocation for all lines that are built within SPP. Therefore, to the extent that SPP incorporates advanced transmission technologies into projects, Empire is also a participant.

Empire is investing about $100 million in its 10-year Operation Toughen Up (OTU) program that began in 2010. The focus of the initiative was to lower the System Average Interruption Duration Index (SAIDI) and System Average Interruption Frequency Index (SAIFI) for Empire customers and increase reliability of the transmission and distribution systems. Individuals within the various facets of Empire were selected for an implementation team in an effort to gain perspective and representation from operations, transmission construction, system protection, and reliability departments. A steering committee was also formed from differing internal departments so that a broad spectrum of specialties would be available to offer guidance to the OTU team. The steering committee tasked the OTU team with addressing the SAIDI and SAIFI for the customers as well as increasing the reliability for power delivery over a 10-year period and allocated the previously mentioned $100 million to be used over the period to address such needs by developing system improvement/hardening plans for existing facilities and future installations which will result in more reliable service for Empire customers. The OTU teem recommends projects to the steering committee to be addressed and given support by the various Empire departments to budget, scope, and implement the proposed projects.

The OTU team's review of SAIDI and SAIFI for the distribution and transmission systems and root cause analysis for reported outages related the indices to causal elements, and proposals for addressing these elements are reflected on an entire system or a more focused effort is applied. As the initial step for evaluation, data was compiled to trend outage causes as compared to the month in which the outage occurred. This data was used as not only a springboard to launch remediation efforts, but also as progress trackers over the course of the

initiative. Empire outages as compared to the EEI-reported outages are more frequently caused by equipment failures, public, and wildlife. In reviewing these causes, the reliability and OTU teams developed means to address Empire-specific outage causes and ways to better insulate customers from the most common outage causes experienced on the Empire system by using advanced technologies to better automate restoration efforts and improve response time to outages. *Table 7-6* - provides a description and schedule for the OTU projects that Empire has planned for the next three years.

Project Type	In Service Date	Description
Transmission Breakers	April of 2013	Install transmission breakers between Joplin 5th street (#284) and Joplin 10th street (#64) Substations, impacting Joplin downtown customers.
Transmission Breakers	2014	Engineer two transmission breakers at Neosho-West Substation (#56) impacting customers in the Neosho and Seneca areas.
Transmission Breakers	2014	Engineer two transmission breakers at Wentworth-West Substation (#205) impacting customers in the Wentworth, Sarcoxie, and Pierce City areas.
Transmission Breakers	2014	Engineer two transmission breakers at Diamond-H.T. Substation (#131) impacting Diamond and Granby customers.
Transmission Breakers	2014	At Fairgrove South Substation (#397), this project adds a third 69kV breaker as well as replaces the existing line relay panels. A differential relay panel and communications panel will also be added.
Transmission Breakers	2015	At Fairland West Substation (#363), this project adds 2 69-kV breakers and associated relay panels. The addition of a 2nd motor operator and 69-kV auto throw-over relay scheme will further increase reliability to the area. Line Work: Install 300' of new conductor to tie Shell Substation into existing 69-kV line. Reroute the incoming and outgoing line segments to allow the breakers to be installed. Additional line rerouting may be required to protect the (#261) Fairland shell tap protection. Line rerouting may not be as severe, with the moving of a switch and some bus work inside of the substation to serve Fairland shell (#261).
Transmission Breakers	2015	At Republic Hines Street Substation (#451), this project adds another 69-kV dead end structure, 2 69-kV breakers, and associated relay panels. Line Work: Install 300' of new 69-kV line and remove existing transmission switches.
Transmission Breakers	2016	At Joplin-Fir Road Substation (#417), this project adds 2 161-kV breakers, a control enclosure, and associated relay panels. At Carl Junction East Substation (#366), this project adds a motor-operated, auto throw-over switch scheme. At Joplin Oronogo Junction Substation (#110), this project replaces the existing line relay panel on the line to Asbury (breaker #16154).

Project Type	In Service Date	Description
Transmission Breakers	2016	Substation Work: At Columbus S.E. Substation #94, this project adds 5 69-kV breakers in a ring-bus configuration, a control enclosure, and associated relay panels. At Columbus Tennessee St. Substation (#282), this project adds a motor-operated, auto throw-over switch scheme. Line Work: Existing lines will need to be rerouted to allow for the substation expansion and inclusion of 69-kV breakers. Provisions should be made for a fifth new line segment exiting the substation to serve the current Columbus tap.
Automated Transfer Scheme	May of 2013	Install at Webb City - Cardinal Substation (#436) impacting Webb City customers.
Automated Transfer Scheme	May of 2013	Install at Nixa - North Substation (#114) impacting Nixa area customers.
Automated Transfer Scheme	2014	Engineer transfer scheme at Joplin 2nd Street and Division Substation (#372) impacting Joplin area customers.
Automated Transfer Scheme	2016	Engineer transfer scheme at Brighton - East substation (#323) impacting Brighton area customers.
Automated Transfer Scheme	2014	Engineer transfer scheme at Sarcoxie - Southwest Substation (#362) impacting Sarcoxie area customers.
Re-closer Control Replacement	2014	Three-Phase Recloser Control Replacement: Replace approx. 15 outdated controls on distribution reclosers throughout system. This project will provide sequence coordination of downstream reclosers; it will also provide better data collection and fault finding capabilities to help reduce SAIDI.
Reconductor	2014	Replace 0.27 miles of #6 CU rotten three phase to 336 ACSR along Knox Avenue from Evergreen to Texas Avenue on Hollister East (#387-2) (this has 336 ACSR on both sides).
Reconductor	2014	Replace 0.6 miles of #6/#8 solid CU 3ph conductor with 1/0 ACSR along 12th Street between Euclid and State Line Road in Galena, Kansas.
Reconductor	2014	Replace 0.54 miles of 8 X rotten single-phase conductor to 1ph 1/0 ACSR along FR82 on Greenfield (#614-2) (2 miles north of Greenfield).
Reconductor	2014	Replace 0.54 miles of 6 X rotten single-phase conductor to 1ph 1/0 ACSR alongFR142 on South Greenfield (#614-1).
Reconductor	2014	Replace 0.55 miles of 6 X rotten single-phase conductor to 1ph 1/0 ACSR (South of Fairplay on Hwy 123 going west; north of 455th Road) on Fair Play East (#217-2).
Reconductor	2014	Replace 0.17 miles of overhead 3ph deteriorated conductor with 3ph 1/0 ACSR along Johnson Drive in Neosho, Missouri.
Reconductor	2014	Replace 3 miles of 8A overhead single-phase deteriorated conductor with 1ph 1/0 ACSR along Base Line Boulevard (Missouri Highway N) from CR120 to CR90 SE of Jasper, Missouri.
Reconductor	2015	Replace 0.14 miles of #6 CU rotten 3ph conductor to 3ph 1/0 ACSR in downtown alley between Church Street and College Avenue (East of Jefferson Park) in Aurora on Aurora Circuit (#124-2).

Project Type	In Service Date	Description
Rebuild	2016	At Baxter Springs West Substation (#271), this project replaces identified B.O. porcelain on switches, bus supports, and D.E. insulators. Line Work: ***2014:*** Construct Phase 1 of 69-kV rebuild from Welch-North (#186) to Chetopa-Twin Valley (#388). ***2014:*** Engineer and purchase rights-of-way for Phase 2 of 69-kV rebuild from Welch-North Substation (#186) to Chetopa-Twin Valley Substation (#388). ***2015:*** Construct Phase 2 of 69-kV rebuild from Welch-North Substation (#186) to Chetopa-Twin Valley Substation (#388).

Table 7-6 - Three-Year Operation Toughen Up Project Schedule

1.6.4 Extreme Weather Capability

Empire examined the sufficiency of the Preferred Plan resources to serve the load forecasted under extreme weather conditions pursuant to 4 CSR 240-22.030(8)(B). For reference, the extreme weather conditions load forecast is developed in Volume 3 - Load Analysis and Load Forecasting at 8.2 Estimate of Sensitivity of System Peak Load Forecasts to Extreme Weather. This sensitivity analysis determined that the summer peak temperatures in the extreme weather case would increase system peak loads by 6.2 percent above the base case load forecast, which is less than the 12 percent capacity margin required by SPP. Without including the benefit of DSM reducing the load, the total system capacity for the Preferred Plan was plotted along with the base forecast peak loads and the resulting extreme weather case peak loads in *Figure 7-6*. The Preferred Plan demonstrated more than sufficient capacity to meet the extreme weather forecast peak loads over the planning period.

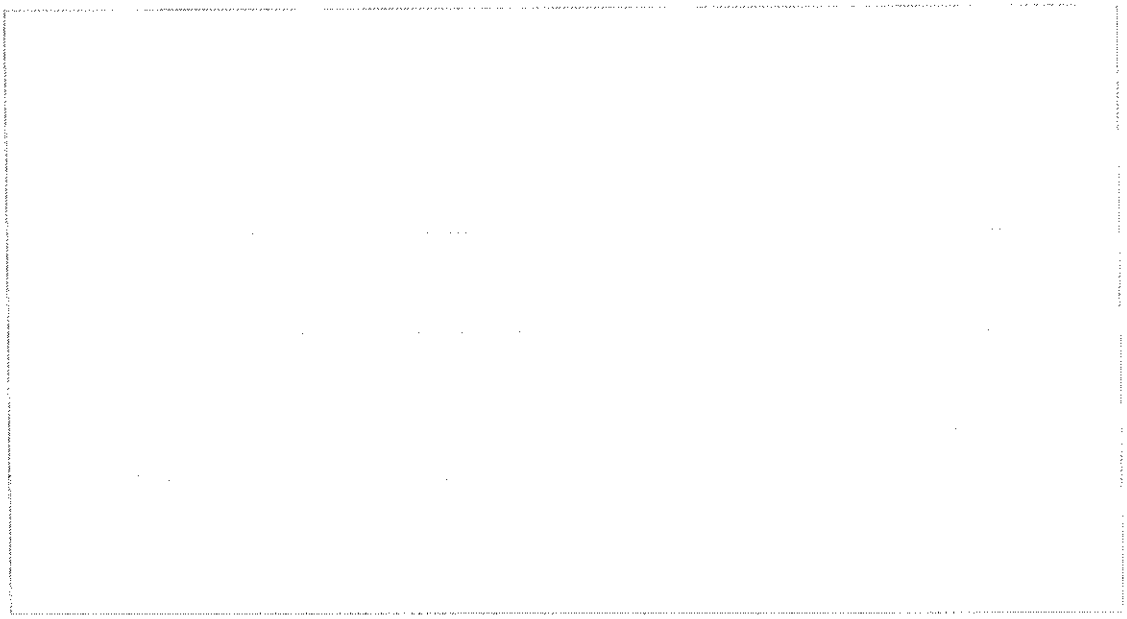

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Figure 7-6 - Extreme Weather Capability of the Preferred Plan

1.7 Utility Decision Makers

The Empire 2013 IRP Team is composed of 14 managers and specialists who were involved in developing this report, led by the utility decision makers. To fulfill the requirements of 4 CSR 240-22.070, the names, titles, and roles of the utility decision makers and the team members are provided in *Table 7-7.*

Name	Title	IRP Function
Kelly Walters	Vice President and Chief Operating Officer - Electric	Executive Staff - Utility Decision Maker
Blake Mertens	Vice President - Energy Supply	Executive Staff - Utility Decision Maker
Laurie Delano	Vice President - Finance and Chief Financial Officer	Executive Staff - Utility Decision Maker
Rob Sager	Controller and Assistant Treasurer/ Assitant Secretary	Financial
Todd Tarter	Manager of Strategic Planning	IRP Project Manager
Rick McCord	Director of Supply Management	Energy Supply, Energy Trading, Next Day Market
Scott Keith	Director of Planning and Regulatory	Director in charge of IRP
Tim Wilson	Director fo Energy Supply Services	Supply-Side, Environmental, Renewable Energy
Shaen Rooney	Manager of Strategic Projects	Supply-Side, Environmental, Renewable Energy
Aaron Doll	Manager Market Settlements and Systems	Load Forecasting and Next Day Market
Nate Hackney	Energy Efficiency Coordinator	Demand-Side
Nate Morris	Manager of System Planning and Protection Engineering	Transmission and Distribution
Josh Eckerman	Planning and Fuel Analyst	Supply-Side
Steve Williams	Planning - Energy Efficiency Analyst	Load Forecasting

Table 7-7 - Empire 2013 IRP Team

SECTION 2 RANGES OF CRITICAL UNCERTAIN FACTORS

(2) The utility shall specify the ranges or combinations of outcomes for the critical uncertain factors that define the limits within which the preferred resource plan is judged to be appropriate and explain how these limits were determined. The utility shall also describe and document its assessment of whether, and under what circumstances, other uncertain factors associated with the preferred resource plan could materially affect the performance of the preferred resource plan relative to alternative resource plans.

2.1 Critical Uncertain Factors

A critical uncertain factor is any uncertain factor that is likely to materially affect the outcome of the resource planning decision. The critical uncertain factors that Empire has identified include environmental costs, market prices/fuel prices, load, and capital/transmission/interest costs. As part of the normal course of business, these factors are monitored very closely by Empire personnel in coordination with senior management. It is important to consider how variations in these factors impact the plans. These critical uncertain factors form the nodes of the decision tree in *Figure 7-7*.

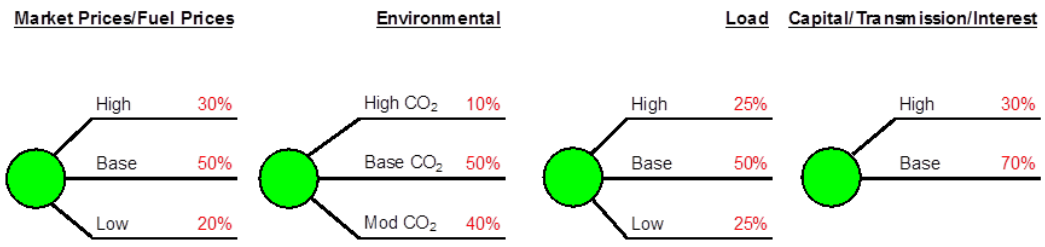


Figure 7-7 - Critical Uncertain Factor Decision Tree

Since the future is unknown, each plan is run through the decision tree generating 54 endpoints (or variable results) for each of the 18 plans for a total of 972 total endpoints. The subjective probabilities, or weighting, are applied to each branch of the tree allowing for the calculation of an expected value. *Figure 7-8* expands on the previous PVRR graph by including a risk value representing the expected or stochastic value of PVRR for each plan.

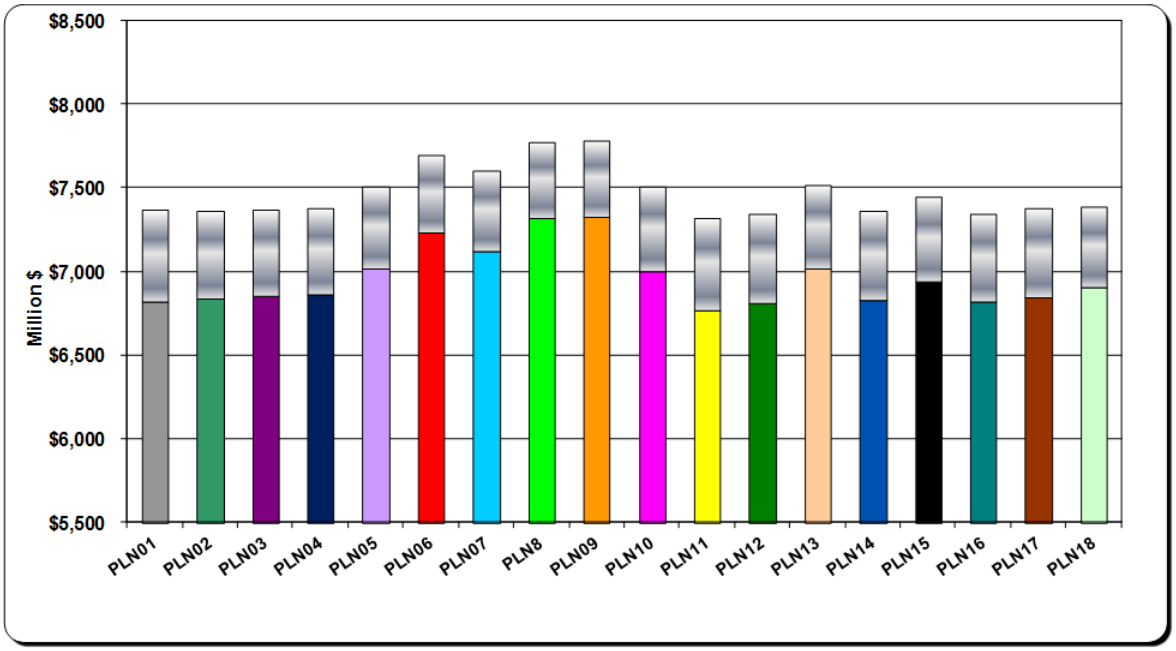


Figure 7-8 - PVRR with Risk Values (2013 to 2032)

Empire continually monitors environmental regulations and requirement, power market and fuel prices, the levels of peak loads during summer and winter months, as well as the capital costs and interest rates associated with generation and transmission projects. These monitoring efforts are describe more fully in section 6 of this volume. Furthermore Empire participates in the stakeholder process and the filing of triennial IRPs and annual updates required under rule 4 CRS 240-22.080, so that the result of Empire's modeling and the effects upon its plans are researched and documented for the Commission every year. Because of the continual cycle of planning, checking, adjusting and repeating, Empire is always focused on regulatory and power industry developments. Given this continual focus and ongoing nature of this planning process, Empire is continually monitoring the ranges or combinations of outcomes for the critical uncertain factors that define the limits within which the preferred resource plan is judged to be appropriate. Another uncertain factor associated with the preferred resource plan that could materially affect the demand-side portfolio of the preferred resource plan relative to alternative resource plans is the upcoming MEEIA filing that is planned to follow this IRP filing.

SECTION 3 BETTER INFORMATION

(3) The utility shall describe and document its quantification of the expected value of better information concerning at least the critical uncertain factors that affect the performance of the preferred resource plan, as measured by the present value of utility revenue requirements. The utility shall provide a tabulation of the key quantitative results of that analysis and a discussion of how those findings will be incorporated in ongoing research activities.

3.1 Expected Value of Better Information

Suppose Empire had the opportunity to conduct a research study that would evaluate each of the four critical uncertainties identified in the Risk Section of Volume 6, which included market and fuel prices, loads, environmental costs, and capital costs. Such a study could help by improving the probability assessments that were assigned to each of these outcomes. However, if the cost of obtaining the research information exceeds its value, Empire should not conduct the study.

To determine the maximum possible value that Empire should pay for better information, it was assumed Empire could obtain perfect information regarding the states of nature, that is, Empire could determine with certainty which state of nature will occur, as provided in *Table 7-8*. To make use of perfect information, a payoff table was developed which is shown in *Table 7-9*. The payoff table illustrates the optimal resource alternative given perfect knowledge of the future.

States of Nature - PVRR ($000,000)

	Market (Power & Fuel)			Environmental			Load Levels			Capital Costs	
Decision	High	Base	Low	High	Base (No)	Low (Moderate)	High	Base	Low	High	Base
PLN02	7932.891	7249.862	6801.539	7946.224	7134.988	7507.475	7454.542	7353.220	7299.443	7653.634	7241.451
PLN11	7919.447	**7197.640**	**6733.239**	**7913.284**	**7087.287**	**7465.825**	**7423.262**	**7305.464**	**7251.018**	**7615.419**	**7195.251**
PLN12	7929.157	7229.348	6774.110	7934.387	7116.346	7491.579	7439.640	7335.789	7281.755	7640.381	7223.041
PLN13	7991.607	7427.049	7028.379	8112.169	7271.738	7673.992	7571.373	7515.476	7464.404	7798.188	7396.037
PLN14	7930.161	7247.175	6799.078	7943.580	7132.266	7504.901	7453.881	7349.918	7296.088	7650.403	7239.044
PLN15	7983.101	7337.056	6907.346	8013.014	7221.333	7582.399	7493.952	7445.868	7394.022	7749.174	7314.536
PLN16	**7908.766**	7230.215	6785.009	7924.556	7115.355	7486.515	7448.526	7332.678	7265.073	7628.111	7223.294

Optimal Decision with Perfect Information - PVRR ($000,000)

	Market (Power, Fuel, Wind)			Environmental			Load Levels			Capital Costs	
Decision	High	Base	Low	High	Base	Low	High	Base	Low	High	Base
Lowest PVRR	7908.766	7197.640	6733.239	7913.284	7087.287	7465.825	7423.262	7305.464	7251.018	7615.419	7195.251
Optimal Decision	PLN16	PLN11	PLN11	PLN11	PLN11	PLN11	PLN11	PLN11	PLN11	PLN11	PLN11

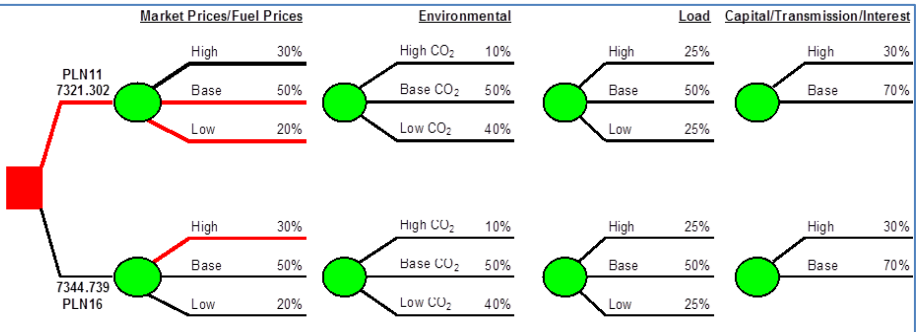
Table 7-8 - EPVI States of Nature

For this IRP, Plan 11 (No DSM) wins in all cases for the study period 2013 through 2032; a decision tree was built using Plan12 (RAP-) for comparison as it was the next best plan. *Figures 7-15* through *7-18* on the following pages display the decision trees and analyses for this comparison. By taking the probabilistic expected value of Plan11 and subtracting the expected value with perfect information, Ventyx determined the expected value of perfect information (EVPI). EVPI represents the theoretical maximum amount of money Empire could spend to obtain additional information about the states of nature, as provided in *Table 7-7.*

Expected Values	Market Mil $	Load Mil $	Environmental Mil $	Capital Mil $
Expected Value of Best Decision	$ 7321.302	$ 7321.302	$ 7321.302	$ 7321.302
Expected Value of Decision Strategy Using Perfect Information	$ 7318.097	$ 7321.302	$ 7321.302	$ 7321.302
Expected Value of Better Information	$ 3.204	$ 0	$ 0	$ 0

Table 7-9 - Summary of the Expected Values of Better Information

The results of this analysis indicated that it would probably not be worthwhile for Empire to spend time and money pursuing better information than it currently possess for the critical uncertain factors, except perhaps for power market and fuel prices. However, spending large sums on sophisticated analyses and forecasts, would not guarantee they are any more accurate or likely than those that Empire already uses.



Expected Value of Perfect Information - Market

Payoff Table for Market (perfect knowledge of outcomes)

	Load Levels		
Decision	High	Base	Low
PLN11	7919.447	**7197.640**	6733.239
PLN16	**7908.766**	7230.215	6785.009

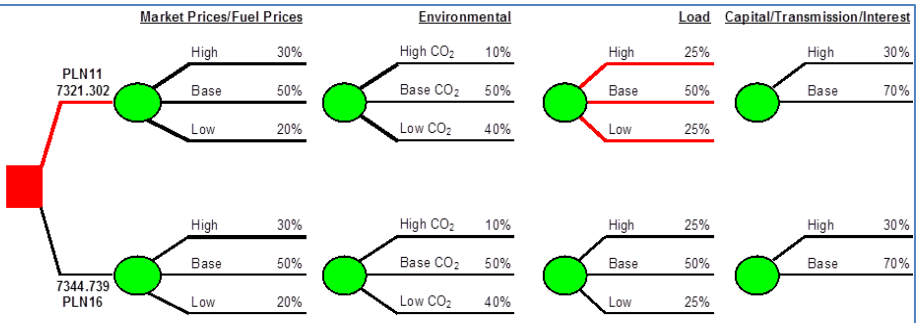
Optimal Decision Strategy with Perfect Information
If High Market Prices occur, then Plan16
If Base Market Prices occur, then Plan11
If Low Market Prices occur, then Plan11

1. Expected Value of Decision Strategy using Perfect Information = (If High, then Plan16; If Base, then Plan11; If Low, then Plan11)
{(7908.766 * 0.30 +7197.640 * 0.50 + 6733.239 * 0.20)}
7318.097

2. Expected Value of Best Decision (Plan11) **7321.302**

3. Expected Value of Perfect Information (EVPI) Expected Value of Best Decision - Expected Value using Perfect Information
7321.302-7318.097
$3.204 million

Figure 7-9 - EVPI - Market Prices and Fuel Prices



Expected Value of Perfect Information - Load

Payoff Table for Load (perfect knowledge of outcomes)

	Load Levels		
Decision	High	Base	Low
PLN11	**7423.262**	**7305.464**	**7251.018**
PLN16	7448.526	7332.678	7265.073

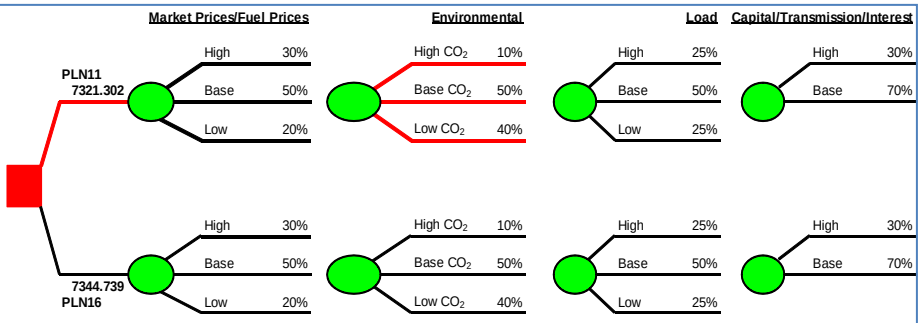
Optimal Decision Strategy with Perfect Information
If High Load occur, then Plan11
If Base Load occur, then Plan11
If Low Load occur, then Plan11

1. Expected Value of Decision Strategy using Perfect Information = (If High, then Plan11; If Base, then Plan11; If Low, then Plan11)
{(7423.262 * 0.30 + 7305.464 * 0.50 + 7251.018 * 0.20)}
7321.302

2. Expected Value of Best Decision (Plan11) **7321.302**

3. Expected Value of Perfect Information (EVPI) Expected Value of Best Decision - Expected Value using Perfect Information
7321.302 - 7321.302
$0.000 million

Figure 7-10 - EVPI - Loads



Expected Value of Perfect Information - Environmental

Payoff Table for Environmental (perfect knowledge of outcomes)

	Environmental		
Decision	High	Moderate	Base (No)
PLN11	**7913.284**	**7465.825**	**7087.287**
PLN16	7924.556	7486.515	7115.355

Optimal Decision Strategy with Perfect Information

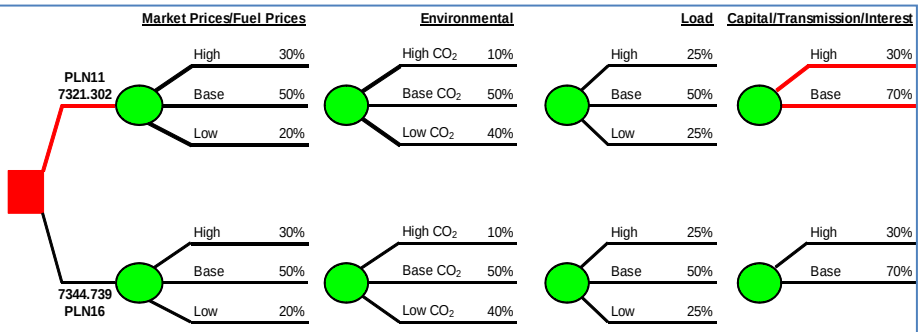
If High Environmental Prices occur, then Plan11
If Low Environmental Prices occur, then Plan11
If No Environmental Prices occur, then Plan11

1. Expected Value of Decision Strategy using Perfect Information = (If High, then Plan11; If Base, then Plan11; If Low, then Plan11; If No, then Plan11)
{(7913.284 * 0.10+ 7465.825 * 0.40 + 7087.287 * 0.50)}
7321.302

2. Expected Value of Best Decision (Plan11) **7321.302**

3. Expected Value of Perfect Information (EVPI) Expected Value of Best Decision - Expected Value using Perfect Information
7321.302 - 7321.302
$0.000 million

Figure 7-11 - EVPI - Environmental Costs



Expected Value of Perfect Information - Capital Costs

Payoff Table for Capital Costs (perfect knowledge of outcomes)

	Capital Costs	
Decision	High	Base
PLN11	**7615.419**	**7195.251**
PLN16	7628.111	7223.294

Optimal Decision Strategy with Perfect Information

If High Capital Cost occur, then Plan04
If Base Capital Cost occur, then Plan02

1. Expected Value of Decision Strategy using Perfect Information = (If High, then Plan04; If Base, then Plan04)
{(7615.419 * 0.30 + 7195.251 * 0.70)}
7321.302

2. Expected Value of Best Decision (Plan11) **7321.302**

3. Expected Value of Perfect Information (EVPI) Expected Value of Best Decision - Expected Value using Perfect Information
7321.302 - 7321.302
$0.000 million

Figure 7-12 - EVPI - Capital Costs

SECTION 4 CONTINGENCY RESOURCE PLANS

(4) The utility shall describe and document its contingency resource plans in preparation for the possibility that the preferred resource plan should cease to be appropriate, whether due to the limits identified pursuant to 4 CSR 240-22.070(2) being exceeded or for any other reason.

4.1 Contingency Resource Plans

The 18 alternative resource plans were described in detail in Volume 6 - Integrated Resource Plan and Risk Analysis, Section 3. For reference, *Table 7-10* provides a summary description for comparison of each of the plans.

Plan	Plan Description	Plan Type	DSM Portfolio	RES Requirement	Carbon Costs for DSM Screening
1	Base Case	Base Plan	Base Portfolio (RAP)	None	None
2	Base Case (meets RPS)	Base Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
3	Moderate Environmental	Other Contingency Plan	Moderate Env Portfolio (higher avoided costs)	15 to 25% by 2021	Begin 2021
4	High Environmental	Other Contingency Plan	High Env Portfolio (highest avoided costs)	15 to 25% by 2021	Begin 2015
5	RAP + DSM	Base Plan	Participation 1/3 between RAP & MAP	15 to 20% by 2021	None
6	RAP ++ DSM	Base Plan	Participation 2/3 between RAP & MAP	15 to 20% by 2021	None
7	Moderate DSM	Required Plan	Moderate (1% savings by 2015)	15 to 20% by 2021	Weighted
8	Aggressive DSM	Required Plan	Aggressive (2% savings by 2020)	15 to 20% by 2021	Weighted
9	MEEIA Level DSM	Required Plan	Designed to meet MEEIA savings goals	15 to 20% by 2021	Weighted
10	Aggressive Capacity DSM	Required Plan	Only DSM utilized to meet future capacity needs	15 to 20% by 2021	Weighted
11	No DSM	Base/Contingency Plan	None	15 to 20% by 2021	None
12	RAP - DSM	Base/Contingency Plan	55% of RAP participation	15 to 20% by 2021	None
13	High Fuel	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
14	Low Fuel	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
15	High Load	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
16	Low Load	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
17	High Fuel (no future coal)	Other Contingency Plan	Base Portfolio (RAP)	15 to 20% by 2021	None
18	Aggressive Renewable	Required Plan	None	Only renewables utilized	None

Table 7-10 - Alternative Resource Plans

There are six base plans (1, 2, 5, 6, 11, and 12) although Plan 1 did not include sufficient RES resources and is not compliant with the IRP rules. Plans 7, 8, 9, 10, and 18 were required by specific rules or prior agreements and are not considered contingency plans.

Plan 12 (RAP minus DSM), which contains the same demand-side programs as the Preferred Plan, but lower customer participation levels to account for demand-side load impact uncertainty, and Plan 11, which contains no DSM, were considered contingency plans,

depending on the outcome of Empire's upcoming MEEIA filing. Plans 11, 12 and the Preferred Plan are very close with regard to PVRR. Plan 11 – has the lowest PVRR of the contingency plans but does not include any DSM resources. Overall, the difference in the 20-year PVRR of these contingency plans is less than 1 percent of each other. On a 40-year PVRR basis, the difference is even smaller.

Like the Preferred Plan, Plan 12 is a comparable base plan but assumes that only 55 percent penetration of RAP DSM would be achieved. Plans 11 (no DSM) and 12 and the Preferred Plan (2) comply with the current Missouri Renewable Energy Standards (RES of 15 percent by 2021) by adding larger replacement wind energy resources, when Empire's current wind PPAs expire. However, if the RAP DSM levels of the Preferred Plan are not achieved, but the 55-percent DSM levels of Plan 12 materialized, then Empire would need to begin adding supply-side resources, one year earlier than for the Preferred Plan, but that would be in the latter part of the study period. With no DSM, Plan 11 would require supply-side to be added about one year earlier than Plan 12. However, none of these contingency plans would require Empire's correction for at least the next decade, during which time Empire will have filed three more triennial IRP reports and seven annual updates with the Commission.

> *(A) The utility shall identify as contingency resource plans those alternative resource plans that become preferred if the critical uncertain factors exceed the limits developed pursuant to section (2).*

The IRP is a snap shot of the forecasts, loads, and resources over the planning horizon as they appear at this time. But given the continual refocus and ongoing nature of this planning process; the upcoming MEEIA filing which will continue the discussion of demand-side resources; the fact that at this time, Empire does not need any uncommitted capacity in the near future; and Empire has just completed a triennial filing with 18 alternate plans, makes Empire well positioned to develop contingency plans if the critical uncertain factors change enough to warrant a different course of action. For example, should higher load levels than contemplated in the Preferred Plan occur, Empire could adjust its planning to a course similar to Plan 15 which was used in this IRP process to determine the potential impact of higher than

expected load growth. Similarly, if load growth is slower or lower than contemplated, Empire could begin to adjust is planning course to the low load scenario contemplated in Plan 16. Also Plan 13 (High Fuel) and Plan 14 (Low Fuel) provides an indication of how Empire's planning could change in the event of higher or lower than forecast fuel process, based upon the information available at this time.

> *(B) The utility shall develop a process to pick among alternative resource plans, or to revise the alternative resource plans as necessary, to help ensure reliable and low cost service should the preferred resource plan no longer be appropriate for any reason. The utility may also use this process to confirm the viability of contingency resource plans identified pursuant to subsection (4)(A).*

Much of the discussion in the previous section also applies to this issue. Empire is continually monitoring the critical uncertain factors and other factors, if any, that could impact the preferred plan. This may involve additional analyses. Additionally, Empire participates in the stakeholder process and the filing of triennial IRPs and annual updates required under rule 4 CRS 240-22.080, so that the result of Empire's modeling and the effects upon its plans are researched, recalculated and documented for the Commission every year. Because of the ongoing nature of the cycle, Empire is always focused on regulatory and power industry developments and the Commission and the stakeholders are continually apprised of how developments affect Empire's performance and plans.

> *(C) Each contingency resource plan shall satisfy the fundamental objective in 4 CSR 240-22.010(2) and the specific requirements pursuant to 4 CSR 240-22.070(1).*

Each of the finalist Base Plans (2, 5, 6, 11, and 12) and each of the Contingency Plans (13, 14, 15, 16, and 17) satisfy the Missouri renewable energy standard mandates. Each of these plans also contains realistically achievable potential (RAP) levels of demand-side management (DSM) programs, except Plan 12, which assumes a reduced level of DSM participation and Plan 11

which contains no DSM. Depending upon the circumstances at the time they are evaluated and that trigger their respective PVRRs to occur, each of these alternative resource plans was configured to satisfy the requirements of these IRP rules for those circumstances.

SECTION 5 LOAD BUILDING PROGRAMS

(5) Analysis of Load-Building Programs. If the utility intends to continue existing load-building programs or implement new ones, it shall analyze these programs in the context of one (1) or more of the alternative resource plans developed pursuant to 4 CSR 240-22.060(3) of this rule, including the preferred resource plan selected pursuant to 4 CSR 240-22.070(1). This analysis shall use the same modeling procedure and assumptions described in 4 CSR 240-22.060(4). The utility shall describe and document-

(A) Its analysis of load building programs, including the following elements:

1. Estimation of the impact of load-building programs on the electric utility's summer and winter peak demands and energy usage;

2. A comparison of annual average rates in each year of the planning horizon for the resource plan(s) with and without the load-building program;

3. A comparison of the probable environmental costs of the resource plan(s) in each year of the planning horizon with and without the proposed load-building program;

4. A calculation of the performance measures and risk by year; and

5. An assessment of any other aspects of the proposed load-building programs that affect the public interest; and

(B) All current and proposed load-building programs, a discussion of why these programs are judged to be in the public interest, and, for all resource plans that include these programs, plots of the following over the planning horizon:

1. Annual average rates with and without the load-building programs; and

2. Annual utility costs and probable environmental costs with and without the load-building programs.

Empire does not have any load building programs in place at this time and does not contemplate adding load building programs during the 20-year planning horizon.

SECTION 6 IMPLEMENTATION PLAN

(6) The utility shall develop an implementation plan that specifies the major tasks, schedules, and milestones necessary to implement the preferred resource plan over the implementation period. The utility shall describe and document its implementation plan, which shall contain-

(A) A schedule and description of ongoing and planned research activities to update and improve the quality of data used in load analysis and forecasting;

(B) A schedule and description of ongoing and planned demand-side programs and demand-side rates, evaluations, and research activities to improve the quality of demand-side resources;

(C) A schedule and description of all supply-side resource research, engineering, retirement, acquisition, and construction activities, including research to meet expected environmental regulations;

(D) Identification of critical paths and major milestones for implementation of each demand-side resource and each supply-side resource, including decision points for committing to major expenditures;

6.1 Implementation Plan

The implementation plan contains the descriptions and schedules for the major tasks necessary to implement the preferred resource plan over the implementation period which is the time interval between the triennial compliance filings. Thus, it can be considered a short-term implementation plan.

6.2 Load Analysis - Schedule and Description

Empire's load forecast is revised annually and close attention is paid to the levels of peak demand during the summer and winter months. Scheduled reviews of the load forecast are held with senior management. Each month, Empire prepares a variance report related to the demand and energy forecast and the actual results.

Each month the Planning and Regulatory Department prepares the Electric Sales and Revenue Variance Report for management. This report compares actual electric peaks, net system input (NSI) sales and revenue versus the forecast of each. It also provides an explanation of variance. This comparison and variance reporting is done at both the revenue class and total system level on a monthly, year-to-date, twelve-months-ended and same month as last year basis. Each

month, the Customer Report and Weather Report is prepared by the Planning and Regulatory department and distributed to management. The Customer Report exhibits the number of customers and the change in customer growth by Commercial Operation Area. Since weather is a key factor for the monthly peak, NSI, sales and revenue, a Weather Report shows how the current month's heating and cooling degrees compared to history. When the load forecasts are developed, input is provided from several areas of Empire including management, Industrial and Commercial Services, and the Commercial Operations areas.

6.3 Demand-Side Implementation Plan

Empire and AEG have prepared a demand-side implementation plan that specifies major tasks, schedules and milestones necessary to implement the preferred demand-side management portfolio over the three-year implementation period. The complete AEG report is found in Volume 5 and its appendices in this IRP. However, the implementation may be modified, depending on the outcome of this IRP and subsequent MEEIA filing. There is a level of uncertainty surrounding the MEEIA filing, including the Commission's approval of the DSM portfolio and the recovery of DSM costs and benefits. This uncertainty could impact the DSM implementation timeline and Empire's ability to move forward with the proposed DSM Portfolio. Due to the uncertainty around the upcoming MEEIA filing, Empire's DSM implementation schedule will remain flexible. *Table 7-11* shows a high-level anticipated implementation schedule.

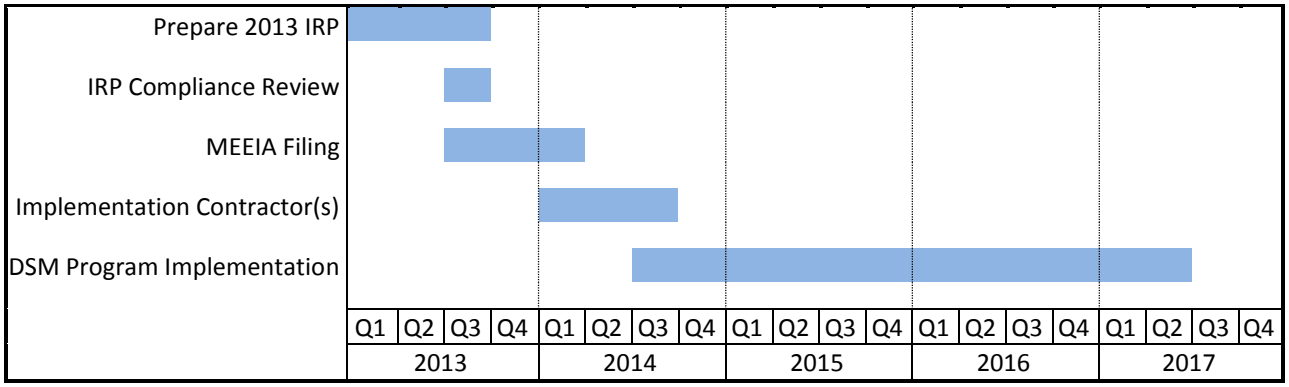


Table 7-11 - Anticipated Demand-Side Implementation Schedule

At this time, the preferred plan DSM portfolio implementation is assumed to begin on June 1, 2014. The proposed DSM Portfolio is comprised of a combination of new and existing programs. However, the existing programs have updated incentives, participants and budgets. Implementation of the proposed DSM Portfolio will require the selection of implementation contractors (anticipated 3 to 6 months). Once the DSM tariffs have been approved by the Commission, Empire will work with the implementation contractors to finalize the program design, develop a marketing plan, and determine a reporting schedule. The implementation contractor will primarily be responsible for:

- Designing and executing marketing materials.
- Establishing and maintaining relationships with trade allies/retailers/etc.
- Processing incentives.
- Tracking program data.

Empire will develop a system for monitoring the progress of the DSM Program implementation. At a minimum, the implementation contractors will provide quarterly status reports for the DSM Advisory Group meetings. Empire will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. Process evaluations will be conducted for each program at the end of the first year and will examine program processes, customer awareness and retailer/customer satisfaction with the program. Impact evaluations will be conducted during the second or third year of the program and will determine the program's energy and demand

impacts and the program's market effects. Empire and the DSM Advisory Group may identify additional evaluations. AEG developed implementation guidelines for each of the DSM programs that are provided on *Figures 7-13* through *7-23* on the following pages.

<table>
<tr><td>Program</td><td>Residential Products Program</td></tr>
<tr><td>Objective</td><td>The program's primary objective is to secure energy savings by incentivizing the purchase of ENERGY STAR® qualified lighting and appliances.</td></tr>
<tr><td>Target Market</td><td>EDE will partner with lighting manufacturers and retailers to encourage the purchase of CFLs and LEDs at the point-of-purchase. In Program Years 2 and 3, the program will focus on expanding partnerships with national retailers and local hardware stores.
EDE will partner with appliance retailers to encourage the purchase of efficient appliances. The target market will be retailers and residential customers.</td></tr>
<tr><td>Description</td><td>Instant rebates will be applied to CFLs and LEDs at the point-of-purchase, varying depending upon the type of lighting, manufacturer and the associated retail cost. Mail-in rebates will be available to customers that purchase efficient appliances, including:
– ENERGY STAR Indoor & Outdoor Fixtures
– Efficient Nightlight
– ENERGY STAR Dehumidifier
– ENERGY STAR Refrigerator
– ENERGY STAR 2-Speed Pool Pump
Empire will engage a third-party contractor to implement the program. The contractor will establish relationships with lighting manufacturers and retailers throughout Empire's service territory.</td></tr>
<tr><td>Program Goals</td><td>– Help residential customers reduce their electricity bills.
– Educate residential customers about the benefits of efficient lighting and appliances.
– Develop partnerships with retailers to market the program.</td></tr>
<tr><td>Eligible Measures and Incentives</td><td>Residential customers will be eligible for instant, point-of-purchase rebates on CFLs and LEDs as well as mail-in rebates on qualifying appliances.
<table>
<tr><td>CFL</td><td>$1.25</td></tr>
<tr><td>LED</td><td>$10</td></tr>
<tr><td>ENERGY STAR Indoor Fixture</td><td>$15</td></tr>
<tr><td>ENERGY STAR Exterior Fixture</td><td>$10</td></tr>
<tr><td>Efficient Nightlight</td><td>$2.50</td></tr>
<tr><td>ENERGY STAR Dehumidifier</td><td>$20</td></tr>
<tr><td>ENERGY STAR Refrigerator</td><td>$30</td></tr>
<tr><td>ENERGY STAR 2-Speed Pool Pump</td><td>$150</td></tr>
</table></td></tr>
<tr><td>Implementation</td><td>Empire will engage a third-party contractor to implement the program. The contractor will provide the necessary services to effectively implement the program and obtain the energy savings goals while adhering to the budget.
The contractor will:
– Establish relationships with lighting manufacturers and retailers throughout Empire's service territory.
– Process incentives.
– Track program data.
– Provide in-store promotional materials and retail sales staff training.
– Market the mail-in rebate program.</td></tr>
</table>

Marketing Strategy

Empire will work with the implementation contractor to market the program. Marketing efforts will include customer awareness and retailer sales staff education.

Marketing to increase customer awareness may include, but not be limited to:

- Bill inserts
- Newspaper advertisements
- Internet placement
- Point-of-Purchase materials (hang tags, posters)

The implementation contractor will develop and maintain partnerships with participating retailers. The contractor will train and educate retail staff.

Estimated Participation

	Year 1	Year 2	Year 3
CFL	250,000	250,000	250,000
LED	500	750	1,000
ENERGY STAR Indoor Fixture	200	300	400
ENERGY STAR Exterior Fixture	200	275	350
Efficient Nightlight	70	80	90
ENERGY STAR Dehumidifier	125	150	175
ENERGY STAR Refrigerator	250	300	350
ENERGY STAR 2-Speed Pool Pump	50	60	70

Estimated Savings

	Net MWh Savings			Net Coincident kW Savings		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
CFL	8,212	8,212	5,201	727	727	460
LED	23	34	28	2.0	3.0	2.5
ENERGY STAR Indoor Fixture	19	29	39	1.7	2.6	3.4
ENERGY STAR Exterior Fixture	21	29	36	0.1	0.1	0.1
Efficient Nightlight	2	2	2	-	-	-
ENERGY STAR Dehumidifier	17	21	24	4.0	4.8	5.6
ENERGY STAR Refrigerator	23	27	31	3.5	4.2	4.8
ENERGY STAR 2-Speed Pool Pump	34	41	47	20	24	28

Estimated Budget

Year 1	Year 2	Year 3
$906,092	$917,837	$929,581

Cost Effectiveness

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	1.34	12.42	1.58	0.28	1.47
Year 2	1.48	12.16	1.76	0.31	1.62
Year 3	1.14	9.05	1.27	0.31	1.23

EM&V

EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-13 - Residential Products Program Implementation Guideline

<table>
<tr><td>Program</td><td>Appliance Recycling Program</td></tr>
<tr><td>Objective</td><td>The program promotes the removal and retirement of inefficient refrigerators and freezers.</td></tr>
<tr><td>Target Market</td><td>Residential customers with working, inefficient refrigerators and freezers.</td></tr>
<tr><td>Description</td><td>The program encourages residential customers to remove inefficient refrigerators and freezers from the electric system and dispose of them in an environmentally safe and responsible manner.

The program provides incentives to customers that turn-in their old, inefficient refrigerator(s) or freezer(s). Customers are limited to 2 rebates per program year. The refrigerator or freezer must be in working condition, between 10 and 30 cubic feet in size and at least five years of age. The refrigerators and freezers will be picked-up at no cost to the customer.

Empire will select a third-party implementation contractor that specializes in appliance recycling and has access to a recycling facility.</td></tr>
<tr><td>Program Goals</td><td>– Promote appliance recycling.
– Educate customers about the benefits of recycling their inefficient appliances.
– Influence consumer behavior by encouraging residential customers to avoid replacing recycled secondary refrigerators or freezers.</td></tr>
<tr><td>Eligible Measures and Incentives</td><td>The program will provide a $35 incentive for each refrigerator and/or freezer recycled. Customers are limited to 2 rebates per program year. The refrigerators and freezers will be picked-up at no cost to the customer.</td></tr>
<tr><td>Implementation</td><td>Empire will select a third-party implementation contractor that specializes in appliance recycling and has access to a recycling facility. The implementation contractor will handle scheduling, appliance pickup, recycling and disposal, and incentive processing.</td></tr>
<tr><td>Marketing Strategy</td><td>Empire will work with the implementation contractor to develop innovative and creative marketing strategies and materials. The program may be marketed through

– Bill inserts
– Newspaper advertisements
– Community events
– Billboards
– Radio advertisements
– Internet Placement
– Advertising in community newsletters</td></tr>
<tr><td>Estimated Participation</td><td>
<table>
<tr><th></th><th>Year 1</th><th>Year 2</th><th>Year 3</th></tr>
<tr><td>Refrigerator Recycle</td><td>400</td><td>500</td><td>600</td></tr>
<tr><td>Freezer Recycle</td><td>75</td><td>100</td><td>125</td></tr>
</table>
</td></tr>
<tr><td>Estimated Savings</td><td>
<table>
<tr><th></th><th colspan="3">Net MWh Savings</th><th colspan="3">Net Coincident kW Savings</th></tr>
<tr><th></th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 1</th><th>Year 2</th><th>Year 3</th></tr>
<tr><td>Refrigerator Recycle</td><td>382</td><td>477</td><td>573</td><td>68</td><td>86</td><td>103</td></tr>
<tr><td>Freezer Recycle</td><td>52</td><td>70</td><td>87</td><td>8</td><td>10</td><td>13</td></tr>
</table>
</td></tr>
<tr><td>Estimated Budget</td><td>
<table>
<tr><th>Year 1</th><th>Year 2</th><th>Year 3</th></tr>
<tr><td>$93,665</td><td>$118,314</td><td>$142,963</td></tr>
</table>
</td></tr>
</table>

<table>
<tr><td>Cost Effectiveness</td><td>
<table>
<tr><th></th><th>TRC</th><th>Participant</th><th>Utility</th><th>Ratepayer Impact</th><th>Societal</th></tr>
<tr><td>Year 1</td><td>1.05</td><td>10.09</td><td>1.36</td><td>0.31</td><td>1.14</td></tr>
<tr><td>Year 2</td><td>1.15</td><td>10.08</td><td>1.49</td><td>0.35</td><td>1.24</td></tr>
<tr><td>Year 3</td><td>1.25</td><td>10.07</td><td>1.62</td><td>0.38</td><td>1.35</td></tr>
</table>
</td></tr>
<tr><td>EM&V</td><td>EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.</td></tr>
</table>

Figure 7-14 - Appliance Recycling Program Implementation Guideline

<table>
<tr><td>Program</td><td>High Efficiency HVAC Program</td></tr>
<tr><td>Objective</td><td>Encourage contractors to use energy efficiency as a marketing tool, stocking and selling more efficient HVAC units and moving the market toward greater efficiency.</td></tr>
<tr><td>Target Market</td><td>Residential customers, including owners of rental properties and new construction, as well as HVAC contractors.</td></tr>
<tr><td>Description</td><td>Residential customers will be eligible to receive financial incentives for
– Early retirement of heat pump systems in operable condition and at least 5 years of age.
– Purchase and installation of energy efficient central air conditioners, heat pumps, furnace fan motors, bathroom exhaust fans and programmable thermostats.
The equipment must be installed by a participating HVAC contractor. The participating HVAC contractor will ensure proper system sizing and installation. Participating HVAC contractors must provide evidence of Air Conditioning Contractors of America (ACCA) Manual J training, the industry standard residential load calculation method. Empire offers free one-day training sessions on ACCA Manual J and Manual D at least twice a year in multiple cities across Empire's Missouri service territory.</td></tr>
<tr><td>Program Goals</td><td>– Educate customers about the benefits of installing high efficiency HVAC equipment.
– Develop partnerships with contractors to bring efficient systems to market.
– Help customers reduce their electricity bills.
– Build consumer confidence in the reliability of savings estimates through an educated and highly trained contract services team.</td></tr>
<tr><td>Eligible Measures and Incentives</td><td>
<table>
<tr><td>CAC SEER 15</td><td>$400</td></tr>
<tr><td>CAC SEER 16</td><td>$450</td></tr>
<tr><td>CAC SEER 17</td><td>$500</td></tr>
<tr><td>Heat Pump SEER 15</td><td>$400</td></tr>
<tr><td>Heat Pump SEER 16</td><td>$450</td></tr>
<tr><td>Heat Pump SEER 17</td><td>$500</td></tr>
<tr><td>Early Retirement HP SEER 16</td><td>$600</td></tr>
<tr><td>Early Retirement HP SEER 17</td><td>$700</td></tr>
<tr><td>Furnace Fan Motor</td><td>$40</td></tr>
<tr><td>HE Bathroom Exhaust Fan</td><td>$20</td></tr>
<tr><td>Programmable Thermostat</td><td>$15</td></tr>
</table>
</td></tr>
<tr><td>Implementation</td><td>Empire will engage a third-party contractor to implement the program. An implementation contractor will:
– Engage local HVAC contractors to participate and market the program
– Process rebates
– Program tracking
– Quality assurance/quality control</td></tr>
<tr><td>Marketing Strategy</td><td>The implementation contractor will develop partnerships with HVAC contractors through education and training seminars, presentations at Chamber of Commerce meetings, and other informational events.
Empire will work with the implementation contractor to market the program to residential customers. Marketing activities may include, but not be limited to:
– Bill inserts
– Newspaper advertisements
– Email blasts
– Bill messaging</td></tr>
</table>

Estimated Participation

	Year 1	Year 2	Year 3
CAC SEER 15	300	350	400
CAC SEER 16	250	300	375
CAC SEER 17	50	60	70
Heat Pump SEER 15	80	90	100
Heat Pump SEER 16	50	75	100
Heat Pump SEER 17	25	30	35
Early Retirement HP SEER 16	10	10	10
Early Retirement HP SEER 17	5	5	5
Furnace Fan Motor	380	425	470
HE Bathroom Exhaust Fan	80	100	120
Programmable Thermostat	400	470	560

Estimated Savings

	Net MWh Savings			Net Coincident kW Savings		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
CAC SEER 15	149	173	198	134	156	179
CAC SEER 16	160	192	240	123	148	185
CAC SEER 17	38	46	54	32	39	45
Heat Pump SEER 15	129	145	92	75	84	57
Heat Pump SEER 16	88	132	107	47	70	57
Heat Pump SEER 17	49	59	45	24	29	21
Early Retirement HP SEER 16	37	37	37	20	20	20
Early Retirement HP SEER 17	19	19	19	10	10	10
Furnace Fan Motor	233	260	286	185	206	227
HE Bathroom Exhaust Fan	6	8	9	0.7	0.9	1.1
Programmable Thermostat	128	153	182	81	95	113

Estimated Budget

Year 1	Year 2	Year 3
$561,960	$669,848	$795,926

Cost Effectiveness

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	1.28	2.70	1.91	0.62	1.34
Year 2	1.38	2.68	2.05	0.67	1.43
Year 3	1.40	2.59	1.96	0.71	1.45

EM&V

EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-15 - Residential High Efficiency HVAC Program Implementation Guideline

Program	**Whole House Efficiency**
Objective	Encourage whole-house improvements to existing homes by enhancing home energy audits and promoting comprehensive retrofit services.
Target Market	Residential customers that own or rent a residence.
Description	The program will consist of 2 Tiers: **Tier 1: Direct Install**. A home energy audit will identify potential efficiency improvements. The program will offer the audit and installation of measures at no cost to the customer. Measures included in the program: air sealing, faucet aerators, low-flow showerhead, water heater temperature setback, advanced power strip, water heater tank wrap, hot water pipe insulation and CFLs. **Tier 2: Insulation**. Customers that have completed Tier 1 are eligible for incentives for the purchase and installation of attic insulation. Empire will engage a contractor to implement and market the program.
Goals	– Demonstrate persistent energy savings. – Encourage energy saving behavior and whole house improvements. – Help residential customers reduce their electricity bills.
Eligible Measures and Incentives	The direct install portion of the program (Tier 1) will be provided at no cost to the customer. – Home energy audit – Air sealing – Faucet aerator – Low-flow showerhead – Water heater temperature setback – Advanced power strip – Water heater tank wrap – Hot water pipe insulation – CFLs Tier 2 incentive for attic insulation will be $300.
Implementation	Empire will engage a third-party contractor to implement the program. An implementation contractor will: – Engage customers and schedule appointments – Hire staff/engage local contractors to conduct audits and measure installations – Market the program – Process rebates – Program tracking – Quality assurance/quality control Residential customers that rent a residence must receive the written approval of the home-owner/landlord to participate in the program.
Marketing Strategy	Empire will work with the implementation contractor to market the program to residential customers. The program will be marketed through direct outreach to customers, including but not be limited to: – Bill inserts – Newspaper advertisements – Email blasts – Bill messaging – Community events

Estimated Participation

	Year 1	Year 2	Year 3
Tier 1	1,000	1,000	1,000
Tier 2	300	300	300

Estimated Savings

	Net MWh Savings			Net Coincident kW Savings		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
Tier 1	1,171	1,171	1,123	276	276	272
Tier 2	525	525	525	83	83	83

Estimated Budget

Year 1	Year 2	Year 3
$1,138,410	$1,138,410	$1,138,410

Cost Effectiveness

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	1.31	14.15	0.88	0.36	1.39
Year 2	1.41	14.15	0.95	0.38	1.49
Year 3	1.50	13.96	1.01	0.41	1.58

EM&V

EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-16 - Whole House Efficiency Program Implementation Guideline

Program	**Low Income Weatherization**
Objective	Deliver long-term energy savings and bill reductions to low-income customers.
Target Market	Low-income residential homeowners and renters.
Description	The program reduces energy costs for eligible low income homeowners and renters through increased home efficiency, at no cost to the participant. Home efficiency is improved through the installation of energy saving measures, such as insulation, caulking, weather stripping and heating system repair or replacement. The program supplements the federal Low Income Weatherization Assistance Program. Empire customers work with one of the Missouri Weatherization Agencies to participate: – Economic Security Corporation of Southwest Area – Ozarks Area Community Action Corporation – West Central Missouri Community Action Agency The Missouri Weatherization Agencies offer cost-effective implementation, which allows most of the program budget to go directly to the purchase and installation of efficient equipment.
Goals	– Demonstrate persistent energy savings. – Encourage energy saving behavior. – Help residential customers reduce their electricity bills.
Implementation	Empire customers work with one of the Missouri Weatherization Agencies to participate: – Economic Security Corporation of Southwest Area – Ozarks Area Community Action Corporation – West Central Missouri Community Action Agency The Missouri Weatherization Agencies offer cost-effective implementation, which allows most of the program budget to go directly to the purchase and installation of efficient equipment.
Marketing Strategy	The Missouri Weatherization Agencies have primary responsibility for promoting the program. Empire will supplement statewide marketing efforts, promoting the program through community events and organizations, including schools, churches and nonprofit organizations within the service territory.
Estimated Participation	350 participants per year
Estimated Savings	**Net MWh Savings per Year**: 771 **Net Coincident kW Savings per Year**: 281
Estimated Budget	**Annual Budget**: $294,000

Cost Effectiveness

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	0.79	1.81	1.92	0.51	0.83
Year 2	0.86	1.81	2.09	0.55	0.90
Year 3	0.93	1.81	2.25	0.60	0.97

EM&V	EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-17 - Low Income Weatherization Program Implementation Guideline

Program	**Low Income New Homes**
Objective	Deliver long-term energy savings and bill reductions to low-income customers.
Target Market	Local non-profit organizations building efficient, affordable new housing for low income customers.

Description	Empire works with local non-profit organizations to encourage efficient, affordable new housing for low income customers. Financial incentives, not to exceed $1,100 per home, are available for the following measures:
	– Building Insulation, full incremental cost above the baseline.
	  – Exterior wall insulation with an R value ≥ 19.
	  – Attic insulation with an R value ≥ 38.
	  – Floor insulation with an R value ≥ 19.
	– Central Air Conditioning, full incremental cost up to $400 for a SEER ≥.
	– Heat Pump, full incremental cost up to $400. The incentive may not exceed the incentive for a similarly rated central air conditioning unit.
	– Refrigerator, up to $200 for an ENERGY STAR refrigerator.
	– Lighting, up to $100 for the installation of ENERGY STAR rated lighting fixtures.
	
	Organizations notify Empire of their intent to participate in the program. Upon acceptance, Empire holds the maximum available financing per home for up to six months, with payment occurring upon receipt and review of paid invoices.

Goals	– Demonstrate persistent energy savings. – Encourage energy saving behavior. – Help residential customers reduce their electricity bills.
Incentives	$1,200 per home
Implementation	Empire customers work with one of the Missouri Weatherization Agencies to participate: – Economic Security Corporation of Southwest Area – Ozarks Area Community Action Corporation – West Central Missouri Community Action Agency The Missouri Weatherization Agencies offer cost-effective implementation, which allows most of the program budget to go directly to the purchase and installation of efficient equipment.
Marketing Strategy	Empire promotes the program directly to local non-profit organizations that work with low income housing.
Estimated Participation	5 participants per year
Estimated Savings	Net MWh Savings per Year: 11 Net Coincident kW Savings per Year: 4
Estimated Budget	Annual Budget: $7,371

Cost Effectiveness	

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	0.53	1.23	1.10	0.42	0.56
Year 2	0.58	1.23	1.19	0.46	0.61
Year 3	0.63	1.23	1.28	0.50	0.66

EM&V	EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-18 - Low Income New Homes Program Implementation Guideline

Program	**School Energy Education Program**
Objective	Build awareness of energy conservation among children
Target Market	School administrators (including teachers), 6th grade students and parents.
Description	The program offers a set of classroom activities and a kit of low-cost energy and water efficiency products to 6th grade students within the Empire service territory. The program helps build awareness of energy conservation among children and can impact customers at all income levels. Teachers will receive education materials including lesson plans, program videos, classroom posters and supplemental activities. Each student receives an Energy Education Kit, which includes: – CFLs and Nightlight – Natural Resources Fact Chart – Digital Water / Air Thermometer – FilterTone® Alarm – Showerhead – Toilet Leak Detector Tablets – Flow Rate Test Bag – Mini Tape Measure Empire will engage a third-party implementation contractor to recruit and train teachers, track participation, and provide support to students and teachers.
Goals	– Educate students about the benefits of efficiency and the opportunities to reduce energy consumption. – Increase awareness of and participation in other Empire energy efficiency programs. – Long-term energy savings through enhanced education and awareness of energy efficiency among students and parents.
Incentives	Educational materials and Energy Education Kits are provided at no cost.
Implementation	Empire will engage a third-party implementation contractor. The implementation contractor will: – Recruit and train teachers – Supply Energy Education Kits – Track participation – Provide support to students and teachers
Marketing Strategy	The program will be marketed to schools officials including teachers, principals and school District personnel. Information on the benefits of this program will be explained teachers or principals prior to handing out the energy kits. Teachers and principals will also receive information on how to present these kits to students.
Estimated Participation	750 participants per year
Estimated Savings	Net MWh Savings per Year: 292 Net Coincident kW Savings per Year: 61
Estimated Budget	Annual Budget: $47,211

Cost Effectiveness	

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	1.13	n/a	1.13	0.28	1.23
Year 2	1.28	n/a	1.28	0.31	1.38
Year 3	1.44	n/a	1.44	0.35	1.55

EM&V	EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-19 - School Energy Education Program Implementation Guideline

Program	**Small Business Lighting Program**
Objective	Improve lighting efficiency for non-residential customers with an average electric demand of less than 250 kW per year.
Target Market	Small business customers with demand less than 250 kW per year.
Description	The program targets non-residential customers with an average electric demand of less than 250 kW per year. The program offers customers a free lighting energy audit that includes information on potential energy savings and anticipated payback as well as incentives that cover up to 70% percent of the equipment and installation costs. Eligible measures include permanent interior lighting fixtures and ballasts, such as T5 lamps, LED exit signs, pulse-start metal halides and occupancy sensors. Empire will select an implementation contractor that will provide the lighting audit and information on lighting incentives. Incentives will be assigned directly to the contractor, so that the value of utility incentives is reduced directly from the sale price of the project.
Goals	– Effectively installing efficient equipment through the program. – Educating commercial customers about the benefits of new energy efficient lighting technologies. – Helping commercial customers reduce their electricity bills. – Building consumer confidence in the reliability of savings estimates through an educated sales force and a highly tailored program approach.
Incentives	Incentives will cover up to 70% of the equipment and installation costs.
Implementation	Empire will select an implementation contractor that will provide the lighting audit and information on lighting incentives. Incentives will be assigned directly to the contractor, so that the value of utility incentives is reduced directly from the sale price of the project. The contractor will be responsible for: – Marketing and promotional activities – Screening eligible measures – Selecting and managing lighting contractors – Tracking program results
Marketing Strategy	The implementation contractor will contact business owners, operators, property owners and tenants as well as participate in trade association and business organization events.
Estimated Participation	300 participants per year

Estimated Savings

Net MWh Savings			Net Coincident kW Savings		
Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
2,598	2,598	2,244	450	450	381

Estimated Budget

Year 1	Year 2	Year 3
$1,558,118	$1,558,118	$1,439,233

Cost Effectiveness

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	1.05	8.41	0.90	0.33	1.13
Year 2	1.13	8.41	0.97	0.35	1.21
Year 3	1.14	7.48	0.97	0.36	1.22

EM&V	EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-20 - Small Business Lighting Program Implementation Guideline

Program	**Commercial and Industrial Rebate Program**
Objective	Encourage purchase and installation of energy efficient equipment by providing incentives to lower the cost of purchasing efficient equipment for commercial and industrial facilities.
Target Market	Commercial and industrial customers
Description	The program provides incentives to lower the cost of purchasing energy efficient equipment for commercial and industrial facilities. The program consists of prescriptive and custom rebates. **Prescriptive**. Pre-qualified prescriptive rebates are available for new construction and retrofits. The rebated measures, including lighting, HVAC equipment, motors and variable frequency drives, are proven technologies that are readily available with known performance characteristics. **Custom**. Equipment that does not qualify for a prescriptive rebate will be eligible for a custom rebate. Applications must be pre-approved by Empire before equipment is purchased and installed to ensure they produce a Societal Benefit-Cost Test of 1.05 or higher and have an incremental payback greater than two years. Incentives are the lesser of the following: – A buy-down to a two year payback; – 50% of the incremental cost; or – 50% of lifecycle avoided demand and energy costs. A $20,000 incentive cap is imposed per facility per program year. However, if funds are still available in the last three months of the program year, the cap may be exceeded. Multiple rebate applications for different measures may be submitted. All C&I customers are eligible to participate in this program. The same customer can participate in more than one measure in the same year, e.g., retrofit a lighting system and upgrade to a more efficient HVAC system.
Goals	– Educate customers about the benefits of installing high efficiency equipment. – Demonstrate persistent energy savings. – Effectively install efficient equipment and systems through the Empire Program. – Help commercial and industrial customers reduce their electricity bills.
Eligible Measures and Incentives	Custom rebates will be calculated for all measures that are not listed under the Prescriptive Rebate program and meet the eligibility requirements above. The listed values are assumed for benefit-cost purposes. In practice, each rebate value and savings will be unique. Rebate values are calculated as either 50% of the incremental cost of the project or $0.30 per kWh savings, whichever is lower.
Implementation	Empire will select an implementation contractor. The contractor will be responsible for: – Marketing and promotional activities – Application processing – Pre-approving Custom Program projects – Tracking program results – Quality assurance/quality control – Screening eligible measures
Marketing Strategy	The program will be marketed through partnerships with Empire trade allies as well as newspaper advertisements, email blasts or targeted mailings to customers and contractors, bill inserts, and advertising in HVAC trade publications.

Estimated Participation

	Year 1	Year 2	Year 3
C&I Custom	30	40	50
C&I Prescriptive	120	130	150

Estimated Savings

	Net MWh Savings			Net Coincident kW Savings		
	Year 1	Year 2	Year 3	Year 1	Year 2	Year 3
C&I Custom	672	896	1,121	116	155	194
C&I Prescriptive	2,410	2,636	2,917	411	455	499

Estimated Budget

	Year 1	Year 2	Year 3
C&I Custom	$44,352	$59,136	$73,920
C&I Prescriptive	$231,007	$255,017	$296,251

Cost Effectiveness

C&I Prescriptive

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	4.69	10.98	8.18	0.48	5.03
Year 2	5.05	10.98	8.80	0.52	5.39
Year 3	5.39	10.98	9.40	0.55	5.75

C&I Custom

	TRC	Participant	Utility	Ratepayer Impact	Societal
Year 1	2.86	7.11	4.94	0.45	3.07
Year 2	3.07	7.04	5.30	0.49	3.28
Year 3	3.19	6.84	5.51	0.52	3.41

EM&V

EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.

Figure 7-21 - Commercial and Industrial Programs Implementation Guideline

<table>
<tr><td>Program</td><td>Building Operator Certification</td></tr>
<tr><td>Objective</td><td>Educate facility managers and operators in the energy efficiency of their equipment and processes.</td></tr>
<tr><td>Target Market</td><td>Commercial and industrial building managers</td></tr>
<tr><td>Description</td><td>The program is a training and certification program that educates facility managers and operators in the energy efficiency of their equipment and processes. The training includes approximately 80 hours of classroom and project work in building systems operation and maintenance. Each course in the series is completed in a one-day training session, except BOC 103 – HVAC Systems and Controls, a two-day course.

Empire offers incentives for Level 1 training, topics HVAC Systems and Controls, Efficient Lighting Fundamentals, Facility Electrical Systems, and Indoor Air Quality. To become certified, participants must pass an exam at the end of each day of training and complete assigned projects. Rebates of $575, half of the training tuition, are provided to Empire participants that complete the certification process.</td></tr>
<tr><td>Goals</td><td>– Educate building operators about the benefits of efficiency.
– Reduce commercial and industrial customer electricity bills.</td></tr>
<tr><td>Incentives</td><td>Participants that complete the certification process receive an incentive of $575, half of the training tuition.</td></tr>
<tr><td>Implementation</td><td>The program is administered by the Missouri Energy Center in partnership with the Midwest Energy Efficiency Alliance (MEEA). The program is targeted towards customers with facilities that employ full-time building operators.</td></tr>
<tr><td>Marketing Strategy</td><td>Empire will continue to work with Missouri Energy Center and MEEA to promote and market the certification program. Marketing activities include targeted mailing to building operators and presentations at Chamber of Commerce meetings and trade conferences.</td></tr>
<tr><td>Estimated Participation</td><td>
<table>
<tr><th>Year 1</th><th>Year 2</th><th>Year 3</th></tr>
<tr><td>30</td><td>45</td><td>60</td></tr>
</table>
</td></tr>
<tr><td>Estimated Savings</td><td>
<table>
<tr><th colspan="3">Net MWh Savings</th><th colspan="3">Net Coincident kW Savings</th></tr>
<tr><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 1</th><th>Year 2</th><th>Year 3</th></tr>
<tr><td>262</td><td>393</td><td>524</td><td>102</td><td>153</td><td>204</td></tr>
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</td></tr>
<tr><td>Estimated Budget</td><td>
<table>
<tr><th>Year 1</th><th>Year 2</th><th>Year 3</th></tr>
<tr><td>$22,641</td><td>$33,961</td><td>$45,281</td></tr>
</table>
</td></tr>
<tr><td>Cost Effectiveness</td><td>
<table>
<tr><th></th><th>TRC</th><th>Participant</th><th>Utility</th><th>Ratepayer Impact</th><th>Societal</th></tr>
<tr><td>Year 1</td><td>1.39</td><td>4.04</td><td>2.44</td><td>0.36</td><td>1.49</td></tr>
<tr><td>Year 2</td><td>1.61</td><td>4.04</td><td>2.84</td><td>0.42</td><td>1.72</td></tr>
<tr><td>Year 3</td><td>1.87</td><td>4.04</td><td>3.29</td><td>0.48</td><td>1.98</td></tr>
</table>
</td></tr>
<tr><td>EM&V</td><td>EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.</td></tr>
</table>

Figure 7-22 - Building Operator Certification Program Implementation Guideline

<table>
<tr><td>Program</td><td>Interruptible Service Rider</td></tr>
<tr><td>Objective</td><td>Reduce customer load during peak periods, upon request by Empire</td></tr>
<tr><td>Target Market</td><td>Commercial and industrial customers with a minimum monthly billing demand of 200 kW.</td></tr>
<tr><td>Description</td><td>The program is intended as a load shedding strategy to be used where system peak demand exceeds available capacity or extreme energy prices are expected. The program is designed to reduce customer load during peak periods, upon request by Empire. The rider is available to commercial and industrial customers with a minimum monthly billing demand of 200 kW and an anticipated minimum load curtailment capability of 200 kW. The program year runs from June 1 through May 31.</td></tr>
<tr><td>Goals</td><td>– Educate non-residential customers about the benefits of reducing load during peak periods.
– Reduce commercial and industrial customer electricity bills.</td></tr>
<tr><td>Incentives</td><td>Estimated $3,000 per participant</td></tr>
<tr><td>Implementation</td><td>Customers voluntarily enter into a contract for a term of one to five years for no greater than 50 MW annually. The contract is automatically renewed for the term of equal length unless termination notice is given by the customer or Empire. The customer rate for service interruption varies according to the length of the contract. Curtailments are limited to ten per year, with a maximum interruption of eight hours per curtailment event.</td></tr>
<tr><td>Marketing Strategy</td><td>Empire markets this program through partnerships with contractors and distributors of energy efficient systems and equipment. Other marketing includes newspaper advertisements, targeted mailings to customers and contractors, bill inserts and advertising in HVAC trade publications.</td></tr>
<tr><td>Estimated Participation, Savings, Budget</td><td>
<table>
<tr><th>Participation</th><th>Net MWh Savings</th><th>Net kW Savings</th><th>Budget</th></tr>
<tr><td>5</td><td>81</td><td>2,738</td><td>$17,640</td></tr>
</table>
</td></tr>
<tr><td>Cost Effectiveness</td><td>
<table>
<tr><th></th><th>TRC</th><th>Participant</th><th>Utility</th><th>Ratepayer Impact</th><th>Societal</th></tr>
<tr><td>Year 1</td><td>20.79</td><td>n/a</td><td>3.11</td><td>2.03</td><td>20.90</td></tr>
<tr><td>Year 2</td><td>26.41</td><td>n/a</td><td>3.95</td><td>2.58</td><td>26.52</td></tr>
<tr><td>Year 3</td><td>31.99</td><td>n/a</td><td>4.79</td><td>3.12</td><td>32.10</td></tr>
</table>
</td></tr>
<tr><td>EM&V</td><td>EDE will engage an EM&V contractor(s) to conduct a process and impact evaluation of the program. The process evaluation will examine program processes, customer awareness and retailer/customer satisfaction with the program. The impact evaluation will determine the program's energy and demand impacts and the program's market effects.</td></tr>
</table>

Figure 7-23 - Interruptible Service Rider Program Implementation Guideline

6.4 Supply-Side Implementation Plan

The only supply-side resources in the next three years involve the Compliance Plan outlined in Volumes 4 and 6 of this report. This would include the Asbury AQCS and turbine project (and the retirement of Asbury 2) and the conversion of Riverton 12 to a combined cycle (and the retirements of Riverton 7, 8 and 9). The following descriptions also provide the milestones and the critical paths for implementation.

6.4.1 Riverton Project

- In September 2012 the use of coal at Riverton Units 7 and 8 was discontinued, and those units are now fired exclusively on natural gas as the first step.
- Empire will monitor carbon dioxide (CO_2) best available control technology (BACT) permitting requirements in the States of Kansas and Missouri and at the Federal level as they relate to permitting the conversion of the Riverton 12 combustion turbine to a combined cycle unit.
- Empire will undertake a study and collect bids to develop project scope and cost for either decommissioning or dismantling Riverton 7 and 8.
    - In order to develop a scope and determine future costs, Empire will have a study performed considering two alternatives: decommissioning or dismantling. Decommissioning would involve performing the required hazardous material abatement, rendering the facility inoperable and leaving the structure and equipment in place for an indeterminate period of time. Dismantling would involve hazardous material abatement, sale or salvage of equipment, demolition of the structures and finishing of the site.
- Empire has begun permitting for the Riverton Unit 12 Combined Cycle conversion and expects to receive a final permit in the summer of 2013. Empire personnel will continue to manage the permit process and monitor construction to assure compliance.
    - Among the regulatory agencies having jurisdiction are the Kansas Department of Health and Environment, the U.S. Environmental Protection Agency; the Kansas Division of Water Resources; the Kansas Department of Wildlife, Parks and Tourism; the U.S. Fish and Wildlife Service and the U.S. Army Corps of Engineers.
- Empire worked with Black & Veatch (B&V) in 2012 to develop a specification for the Riverton combined cycle project to support the release of a request for proposals. The RFP was issued to six bidders in January 2013, and four bids were

returned in response. Empire performed a rigorous evaluation of the bids, and after interviewing the bidders with the two highest scoring proposals, is in the final selection and negotiation process.

- Riverton construction is expected to begin in the summer of 2014, with the unit available for service in mid-2016.
- At the time the Riverton Unit 12 Combined Cycle enters commercial operation, Riverton 7, 8 and 9 will be retired.

6.4.2 Asbury Project

- The Asbury AQCS and turbine project is underway.
  - In January 2012, Empire entered into a contract with a joint venture formed by Alberici Constructors and Stanley Consultants for the construction of an AQCS, consisting of a circulating dry scrubber, pulse jet fabric filter and powder activated carbon injection system. This system of equipment will allow Asbury to continue operating in compliance with pending environmental regulations. Construction is in progress, and completion is anticipated in early 2015.
  - Asbury unit 2 will retire in late 2013 or early 2014, so that it's generator step up transformer can be used to supply energy to the AQCS.
  - In the 2014 outage to complete the AQCS tie-in, Empire will install upgraded steam turbine hardware that will increase the turbine output. This will partially compensate for the retirement of unit 2 and the increased auxiliaries associated with the operation of the new AQCS equipment.
  - Empire contracted with Aquaterra to complete an ash impoundment study to determine potential locations and associated construction and operating and maintenance costs for a new Asbury and/or Riverton landfill to address Empire's existing and future Coal Combustion Residuals (CCR)
    - Based on Aquaterra's report and further study, Empire has moved forward on development of a new CCR landfill at Asbury. A parcel of land adjacent to the plant property was purchased, and site investigations have commenced. Assuming a favorable outcome on the permitting process, the landfill should be available to receive CCR in the third or fourth quarter of 2016.

(E) A description of adequate competitive procurement policies to be used in the acquisition and development of supply-side resources;

6.5 Competitive Procurement Policies

Prior to issuing requests for proposals, Empire pre-screens potential bidders' qualifications and experience to confirm that those who are allowed to propose on projects are capable of completing the work safely and satisfactorily. Thereafter, as described above in subsection 6.4 in response to 22.070 (6) (C), Empire utilizes the competitive bidding process and performs rigorous evaluations of the proposals submitted to secure the best evaluated goods and services for implementing the development of its supply-side resources. This policy and procedure are in the best interests of Empire's rate payers and stockholders, the other stakeholders and the public at large.

6.6 Monitoring Critical Uncertain Factors

(F) A process for monitoring the critical uncertain factors on a continuous basis and reporting significant changes in a timely fashion to those managers or officers who have the authority to direct the implementation of contingency resource plans when the specified limits for uncertain factors are exceeded; and

6.6.1 Monitoring Environmental Costs

Empire personnel monitor environmental regulations and requirements to determine what actions need to be undertaken to ensure compliance and to determine the costs associated with that compliance. Among the environmental issues Empire is currently tracking are issues relating to ozone; sulfur dioxide (SO_2); nitrogen dioxide (NO_2); the Clean Air Interstate Rule (CAIR) and/or the Cross State Air Pollution Rule (CSAPR); water; particulate matter; the Coal Combustion Residuals (CCR) rule relating to ash; mercury and hazardous air pollutants (Hg/HAPS); and carbon dioxide (CO_2). The information gathered is shared through discussions with senior management.

Environmental issues are monitored by the Energy Supply Services department. Energy Supply Services department works with various other departments and management to monitor environmental costs and issues at Empire's generation facilities. Energy Supply Services provides management with the Annual NO_x Allocation Projection, the SO_2 Allowance Management Policy (SAMP) and the Greenhouse Gas Projections and Emissions Inventory. Empire also subscribes to JD Energy environmental forecasting services. The Energy Supply Services department provides management with a quarterly Environmental Key Issues Summary, as well. As important environmental issues develop, management is updated. Personnel from the Environmental staff are in regular contact with local, state and federal environmental agencies. They attend various environmental events. Empire is an active member of the Air and Waste Management Association, the EEI, the Regulatory Environmental Group for Missouri (REGFORM), the Missouri Electric Utilities Environmental committee (MEUEC), and various other state committees and organizations.

6.6.2 Monitoring Market and Fuel Prices

Power prices and fuel prices are regularly monitored by operational personnel. Both operational personnel and senior management are kept abreast of the processes and procedures being implemented in the Southwest Power Pool (SPP) that directly impacts the availability and pricing of power. The price of natural gas is closely monitored. As documented in Volume 4, Empire implemented a natural gas risk management policy that has an objective of minimizing the impact of natural gas price volatility. The risk management policy includes monitoring of natural gas prices. The natural gas risk management policy is overseen and positions taken are approved annually by senior management.

Empire purchases fuel and power on a continuous basis. Each month fuel and energy accountants prepare reports for management, such as reports known as the Summary of Fuel and Purchased power Report, the Electric Fuel Report and the Purchased and Exchanged Power Allocation Report. The Summary of Fuel and Purchased Power Report compares generation, fuel costs and purchase costs, actual to budget on a monthly, year-to-date and twelve-months-

ended basis. The Electric Fuel Report contains detailed fuel usage and cost information by generating unit, plant and entire system on a monthly, year-to-date and twelve-months-ended basis. The Purchased and Exchanged Power Allocation Report is a detailed list of power purchases for the month. Explanations for variances from budget are also reported to management. Empire's Electric Gas Position Report is supplied to management on a weekly basis. It reports detailed natural gas price and natural gas hedged amount information. This report contains a natural gas position summary, trading detail, market detail, storage balance and other information. It tracks both hedged and spot market natural gas activity. The market detail section lists current natural gas market futures prices and basis adjustment estimates for the next several years.

6.6.3 Monitoring Load Growth

Empire's load forecast is revised annually and close attention is paid to the levels of peak demand during the summer and winter months. Scheduled reviews on the load forecast are held with senior management. Each month, Empire prepares a variance report related to the demand and energy forecast and the actual results.

Each month the Planning and Regulatory Department prepares the Electric Sales and Revenue Variance Report for management. This report compares actual electric peaks, net system input (NSI) sales and revenue versus the forecast of each. It also provides an explanation of variance. This comparison and variance reporting is done at both the revenue class and total system level on a monthly, year-to-date, 12-months-ended and same month as last year basis. Each month, the Customer Report and Weather Report is prepared by the Planning and Regulatory department and distributed to management. The Customer Report exhibits the number of customers and the change in customer growth by Commercial Operation Area. Since weather is a key factor for the monthly peak, NSI, sales and revenue, a Weather Report shows how the current month's heating and cooling degrees compared to history. When the load forecasts are developed, input is provided from several areas of Empire including management, Industrial and Commercial Services, and the Commercial Operations areas.

6.6.4 Monitoring Construction/Transmission/Interest Rates

The capital costs associated with generation and transmission projects are monitored by Empire in a variety of ways. A project development team is formed for each major generation project with direct line reporting to a member of senior management. Finance personnel monitor the markets daily to track interest rates, are in frequent contact with the rating agencies, and are kept abreast of planned budgets for new projects. These efforts are coordinated with members of senior management.

Empire monitors the state of current estimates of construction costs for supply-side resources via industry periodicals such as Platt's and the EIA Annual Energy Outlook. Empire has contracted with engineering firms such as Black & Veatch, Burns and McDonnell, Sega, Inc., and others for construction cost estimates on an as needed basis. Empire has recent experience with several new generation construction projects with various technologies including combined-cycle, simple cycle combustion turbine, aeroderivative combustion turbine, wind turbines and coal plants. These types of construction projects are monitored by Project Managers. Energy Supply Services reports are provided to management on a monthly basis. Empire actively participates in the Southwest Power Pool Inc. regional transmission organization's (SPP RTO) transmission planning studies. SPP conducts several studies directly associated with transmission planning: the Balanced Portfolio Study, the Priority Projects Study, Aggregate Facilities Studies, the SPP Transmission Expansion Plan (STEP), and Integrated Transmission Plans (Near Term, 10-Year, and 20-Year Plans). A copy of each of these studies is provided in the appendices to Volume 4.5 – Transmission Distribution Analysis in response to rule 22.045(6). In addition to the aforementioned and attached studies, Empire, through its representation on various working groups, participates in any applicable High Priority and special case studies as deemed necessary by the respective overseeing working groups.

6.6.5 Range of Outcomes

Empire's operating structure is organized in such a manner that senior management is both involved in and well-informed as to the key factors that have been identified in this IRP as the critical uncertain factors. Due to the level of communication and information flow within the Company, significant changes in these factors can be addressed immediately with appropriate changes to the Preferred Plan, implementation plan, or any other portion of the IRP prior to the next scheduled IRP filing and/or IRP Annual update. Empire will determine the range of outcomes within which the Preferred Plan is judged to be appropriate in accordance with 4 CSR 240-22.070. As previously mentioned, the DSM portfolio could be influenced by the upcoming MEEIA filing. Empire agreed to bring forward as part of a follow on MEEIA filing any cost effective realistic achievable potential (RAP) DSM portfolio from the 2013 IRP's preferred plan. Empire agreed to make the follow on MEEIA filing within 90 days of a meeting with the Advisory Group to Empire's IRP, unless agreed otherwise by the parties. Therefore, the selection and implementation of the DSM included in the preferred plan and the demand-side investment mechanism (DSIM) required to support that level of DSM investment will be the subject of Commission review and approval in the upcoming MEEIA filing.

Through such monitoring of the critical uncertain factors, Empire may decide that changes to its Preferred Plan are warranted.

6.7 Monitoring Preferred Resource Plan

> *(G) A process for monitoring the progress made implementing the preferred resource plan in accordance with the schedules and milestones set out in the implementation plan and for reporting significant deviations in a timely fashion to those managers or officers who have the authority to initiate corrective actions to ensure the resources are implemented as scheduled.*

HC

6.7.1 Preferred Plan Performance Measures

The performance measures of the preferred resource plan required by rule for each year of the planning horizon are presented below in *Table 7-12*. These measures include: estimated annual revenue requirement; estimated level of average retail rates and percentage of change from the prior year; and estimated company financial ratios. The annual results of the performance measures are illustrated in *Figures 7-24* through *7-31* that follow.

****Highly Confidential in its Entirety****
Table 7-12 - Preferred Plan Performance Measures

Highly Confidential in its Entirety
Figure 7-24 - Average System Rate Revenue

Highly Confidential in its Entirety
Figure 7-25 - Preferred Plan Average Rate Change - Percent of Revenue

HC

Highly Confidential in its Entirety
Figure 7-26 - Preferred Plan Cumulative Rate Increases

Highly Confidential in its Entirety
Figure 7-27 - Preferred Plan Capital Forecast

HC

Highly Confidential in its Entirety
Figure 7-28 - Preferred Plan Capitalization Ratios

Highly Confidential in its Entirety
Figure 7-29 - Preferred Plan Debt to Capital Ratio

HC

Highly Confidential in its Entirety
Figure 7-30 - Preferred Plan Pretax Interest Coverage Ratio

Highly Confidential in its Entirety
Figure 7-31 - Preferred Plan Net Cash Flow to Capital Expenditures

SECTION 7 RESOURCE ACQUISITION STRATEGY

(7) The utility shall develop, describe and document, officially adopt, and implement a resource acquisition strategy. This means that the utility's resource acquisition strategy shall be formally approved by an officer of the utility who has been duly delegated the authority to commit the utility to the course of action described in the resource acquisition strategy. The officially adopted resource acquisition strategy shall consist of the following components:

Empire's resource acquisition strategy has been formally approved by the signatories to the filing of this IRP.

7.1 Preferred Resource Plan

(A) A preferred resource plan selected pursuant to the requirements of section (1) of this rule;

The preferred Plan was described and documented in Section 1 above in response to rule 22.070 (1).

7.2 Implementation Plan

(B) An implementation plan developed pursuant to the requirements of section (6) of this rule; and

The Preferred Plan's implementation plan was described and documented in Section 6 above in response to rule 22.070 (6).

7.3 Contingency Resource Plans

(C) A set of contingency resource plans developed pursuant to the requirements of section (4) of this rule and identification of the point at which the critical uncertain factors would trigger the utility to move to each contingency resource plan as the preferred resource plan.

The contingency resource plans were described and their applicability was discussed in Section 4 above in response to rule 22.070 (4).

SECTION 8 EVALUATION OF DEMAND-SIDE PROGRAMS AND DEMAND-SIDE RATES

(8) Evaluation of Demand-Side Programs and Demand–Side Rates. The utility shall describe and document its evaluation plans for all demand-side programs and demand-side rates that are included in the preferred resource plan selected pursuant to 4 CSR 240-22.070(1). Evaluation plans required by this section are for planning purposes and are separate and distinct from the evaluation, measurement, and verification reports required by 4 CSR 240-3.163(7) and 4 CSR 240-20.093(7); nonetheless, the evaluation plan should, in addition to the requirements of this section, include the proposed evaluation schedule and the proposed approach to achieving the evaluation goals pursuant to 4 CSR 240-3.163(7) and 4 CSR 240-20.093(7). The evaluation plans for each program and rate shall be developed before the program or rate is implemented and shall be filed when the utility files for approval of demand-side programs or demand-side program plans with the tariff application for the program or rate as described in 4 CSR 240-20.094(3). The purpose of these evaluations shall be to develop the information necessary to evaluate the cost-effectiveness and improve the design of existing and future demand-side programs and demand-side rates, to improve the forecasts of customer energy consumption and responsiveness to demand-side programs and demand-side rates, and to gather data on the implementation costs and load impacts of demand-side programs and demand-side rates for use in future cost-effectiveness screening and integrated resource analysis.

Empire has designated approximately 5 percent of its portfolio budget for Evaluation, Measurement, and Verification (EM&V) activities. To cost-effectively evaluate Empire's DSM programs, the evaluation contractor will evaluate each program every two years, starting with the beginning of the second program year. This plan provides a high level, multi-year evaluation approach for Empire's energy efficiency program portfolio.

8.1 Project Initiation Meetings

The evaluation contractor will meet with Empire staff (and their contractors, if desired) annually in person or via teleconference to discuss evaluation objectives, a common set of expectations about what the evaluation will provide, and an agreement on the methods to be

used to evaluate each program. The meeting will also provide an opportunity to review the data requirements for meeting the study objectives, establish the schedule of deliverables, set up a communications protocol, and develop a good working relationship.

8.2 Evaluation Plans

Program evaluation supports the need for public accountability, oversight, validation of program performance, and cost-effective program improvements. An evaluation plan provides a roadmap for program evaluation activities, identifying evaluation objectives, the evaluation approach, data collection, sampling plans, and work schedule.

The evaluation contractor will develop detailed evaluation plans for each program. The plans will support a comprehensive approach, designed to be revised and extended into future years. The evaluation plan will include study strategies and techniques, study objectives, key researchable issues, data collection and analysis approaches, sampling strategies, timelines, and deliverables by the programs to be evaluated that year.

8.3 Program Design and Delivery Review

A program design and delivery review will be completed as part of the Year 1 process evaluation. This will include staff interviews and a review of the tracking system.

The evaluation contractor will conduct in-depth interviews with Empire design and delivery staff. The interviews with program managers and staff will discuss the roles and responsibilities of staff and trade allies; program goals, successes, and challenges in meeting these goals; the effectiveness of the programs' operations relative to the defined program goals and objectives; reasons for variance in program performance by customer class or territory; and areas in need of improvement in program design and implementation. The evaluation contractor will complete an interim memo summarizing the results of the program design and delivery review.

Quality program tracking systems are integral for effective program planning, implementation, and evaluation. The evaluation contractor will evaluate Empire's tracking system including initial data validation (application processing, measure and savings capture and validation, audit trail, and system location), security, and data granularity (types of data being captured, QA/QC processes, data thresholds and back-up data capture, refresh rate, and automated validations).

8.4 Evaluation Management and Reporting

The evaluation contractor will meet with Empire in person or via teleconference to summarize tasks completed for the month, problems encountered and solutions implemented, schedule and budget issues and updates, and tasks planned in the next month. The evaluation contractor will have ad-hoc meetings with Empire staff as needed to resolve issues as they arise and maintain ongoing communication.

It is imperative that the evaluation provide and discuss preliminary findings at the end of each data collection and analysis activity. This type of regular reporting ensures that the findings from each activity can be used to modify the programs as needed to improve their performance. The evaluation contractor will provide Empire with interim evaluation memorandum reports that will summarize preliminary evaluation findings and potential recommendations stemming from those findings.

The evaluation contractor will compile and synthesize the results of all evaluation activities each year into an annual comprehensive evaluation report that will identify key findings and recommendations at the cross-cutting and sector level (residential and commercial) as well as program level. The annual evaluation reports will be finalized by the end of each calendar year.

8.5 Process Evaluation

(A) Process Evaluation. Each demand-side program and demand-side rate that is part of the utility's preferred resource plan shall be subjected to an ongoing evaluation process which addresses at least the following questions about program design.

DSM process evaluations will be conducted for each program at the end of the first year. The purpose is to assess the effectiveness of program processes, evaluate the achievements of program objectives, and make recommendations for program improvements. A good process evaluation will:

1. Assist program implementers and managers with managing programs to achieve cost-effective savings while maintaining high levels of customer satisfaction.

2. Determine awareness levels to refine marketing strategies and reduce barriers to participation.

3. Provide recommendations for changing the program's structure, management, administration, design, delivery, operations, or targets.

4. Determine if best practices should be incorporated.

5. Gather information from a variety of sources to address the issues stated above.

The process evaluations will provide recommendations to Empire, program implementers, and other program stakeholders on program design, delivery, and administration. The evaluation contractor will develop individual program plans that identify project objectives, data resources and collection, key researchable issues, budget, and timeline. Once the evaluation plans have been reviewed by Empire, the evaluation contractor will design the sample plan and data collection instruments, and collect and analyze the data. The evaluation contractor will synthesize the findings and present recommendations to Empire in draft and final evaluation reports.

1. What are the primary market imperfections that are common to the target market segment?

2. Is the target market segment appropriately defined, or should it be further subdivided or merged with other market segments?

3. Does the mix of end-use measures included in the program appropriately reflect the diversity of end-use energy service needs and existing end-use technologies within the target market segment?

4. Are the communication channels and delivery mechanisms appropriate for the target market segment?

5. What can be done to more effectively overcome the identified market imperfections and to increase the rate of customer acceptance and implementation of each end-use measure included in the program?

8.5.1 Data Collection and Sampling Plan

The data collection plan will define the specific data collection requirements, along with the source of the information and the use to which the data will be put, the timing of the data collection, in relation to the rest of the plan, to assure that it meets the overall needs of the study, and the scheduling method and plan or coordinating contacts.

The sampling plan will describe the sample design, interview methodology, and stratification of each program. Interviews of the major personnel categories will include Empire staff, program managers, third party implementers, participating and non-participating customers, and participating and non-participating trade allies, in addition to others.

The sample size of each group will be calculated at a 90-percent confidence interval with an error margin of ±10 percent. The number of completed interviews will provide a sufficient sample to meet the confidence interval requirements. The interview methodology will range depending on the market actor being interviewed, from on-site interviews, in-depth interviews, or computer-assisted telephone interviews.

8.5.2 Program Design and Delivery Staff Interviews

Interviews with program staff will be conducted in-person and will focus on the program history and design, identifying areas for program improvement and the overall effectiveness of the program. The third party implementer interviews will be conducted at the locations where program files are maintained. Particular attention will be paid to the contractor's perception of how the programs operate, what program data are tracked and captured, how the data are managed and maintained, and how program subcontractor(s) are managed, if applicable.

Questions will be based on both portfolio and program level activities and achievements. Answers to these questions will help identify process improvements that can make the program more efficient and consequently more cost-effective and will be summarized in a chapter of the process evaluation report.

8.5.3 Customer Data Collection

Surveys of participating customers will be conducted via telephone. Participating customers will be asked about their experiences with the program including the effectiveness and satisfaction with the program, the contractor/trade ally, the equipment itself, and marketing outreach. Participants will also answer a series of questions regarding program awareness, attitudes of energy efficiency and energy conservation, overall satisfaction, and barriers to participation, spillover, and areas of improvement. The findings from the customer surveys will be summarized in a chapter of the process evaluation and the data tables from these surveys will be provided in separate appendices.

8.5.4 Trade Ally Data Collection

Trade allies will be asked about clarity of program rules, usefulness of support materials, marketing and coordination efforts, and application processes. These responses will be instrumental in developing recommendations for improvement that will improve program

effectiveness and customer satisfaction and remove barriers to participation. Trade ally interviews will also attempt to gather information that could be used to assess market effects or other program-related impacts such as free-ridership and spillover.

8.5.5 Non-Participating Customer and Trade Ally Data Collection

Where appropriate, interviews with non-participating customers and trade allies will be conducted to better understand the market, free ridership, spillover, and how the program can increase participation and effects in the market. These interviews will also provide insights into removing barriers to participation and improved marketing methods and messages.

8.5.6 Document Review

In addition to stakeholder interviews, the evaluation contractor will collect program materials including process flowcharts, and marketing and outreach materials such as point of purchase (POP) materials, print and radio advertising copy, and any cooperative marketing materials developed. The evaluation contractor will also request information on actual activities such as completed marketing campaigns. Marketing schedules and quantitative data, such as enrollments per month, will be overlaid to determine the impacts of these campaigns.

8.6 Impact Evaluation

> *(B) Impact Evaluation. The utility shall develop methods of estimating the actual load impacts of each demand-side program and demand-side rate included in the utility's preferred resource plan to a reasonable degree of accuracy.*
>
> *1. Impact evaluation methods. At a minimum, comparisons of one (1) or both of the following types shall be used to measure program and rate impacts in a manner that is based on sound statistical principles:*
>
> *A. Comparisons of pre-adoption and post-adoption loads of program or demand-side rate participants, corrected for the effects of weather and other intertemporal differences; and*
>
> *B. Comparisons between program and demand-side rate participants' loads and those of an appropriate control group over the same time period.*

2. The utility shall develop load-impact measurement protocols that are designed to make the most cost-effective use of the following types of measurements, either individually or in combination:

A. Monthly billing data, hourly load data, load research data, end-use load metered data, building and equipment simulation models, and survey responses; or

B. Audit and survey data on appliance and equipment type, size and efficiency levels, household or business characteristics, or energy-related building characteristics.

(C) The utility shall develop protocols to collect data regarding demand-side program and demand-side rate market potential, participation rates, utility costs, participant costs, and total costs.

Impact evaluations will include estimated gross and net demand, energy savings, and the cost effectiveness of installed systems. They are used to verify measure installations, identify key energy assumptions, and provide the research necessary to calculate defensible and accurate savings attributable to the program. Impact evaluations are typically conducted one year after the program is implemented because program results may not be accessible or apparent before then.

The evaluation contractor will adhere to the state evaluation protocols to obtain unbiased reliable estimates of program-level net energy and demand savings over the life of the expected net impact. Measurement and Verification (M&V) may be conducted at a higher level of rigor or with greater precision than the protocols (depending on resources or program goals), where more inputs measured or metered, but M&V may not use a lower level of rigor than is specified in the evaluation protocol.

Program level impact evaluations will be conducted to verify measure installations and identify key energy assumptions for equipment life, incremental equipment cost, program budget information, number of participants, free ridership, and spillover. The evaluation will also provide the necessary research to calculate defensible and accurate savings attributable to the program.

The primary data collection methodologies for the impact evaluation will include:

1. Strategies to measure and verify energy efficiency installation and determine energy impacts for each program, as appropriate, in kilowatt-hour or kilowatt reductions:
    a. Sample for field verification activities.
    b. Field verification activities and observations.
    c. Adjusted measure savings values based on field activities and data reviews.
2. Program-specific realization rates.
3. Energy savings based on four annual time periods (on-peak and off-peak).
4. Billing analyses.
5. Applications and supporting documentation provided to Empire from customers, as appropriate.
6. Conclusions and recommendations for more accurately estimating energy savings for each program.

Secondary data sources will be used for assumptions that do not require primary data collection.

The evaluation contractor will use inputs specific to Empire, including avoided costs and discounts rates, to conduct cost-effectiveness analysis and program screening. The program evaluator will evaluate cost-effectiveness using the standard California tests including Total Resource Cost, Societal Cost Test, Participant Test, Utility Test, and Rate Impact Measure Test. These tests consider the overall costs and benefits from various perspectives. All results will be provided with estimates of present value benefits, cost, net benefits, and benefit-cost ratios. The analysis will include both a retrospective look at the program to date and a prospective analysis of the future of the program.

All work will be designed to meet the appropriate International Performance Measurement and Verification Protocol (IPMVP) and the State of Missouri EM&V protocols.